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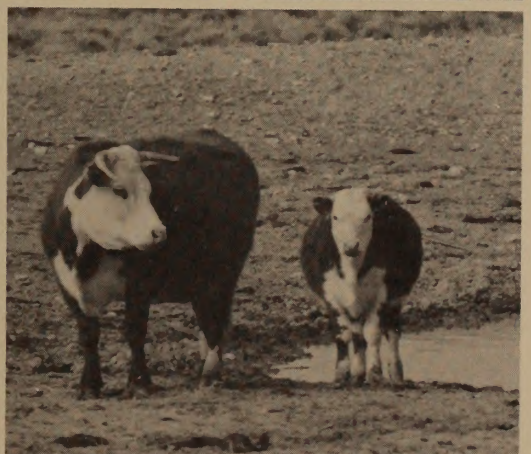
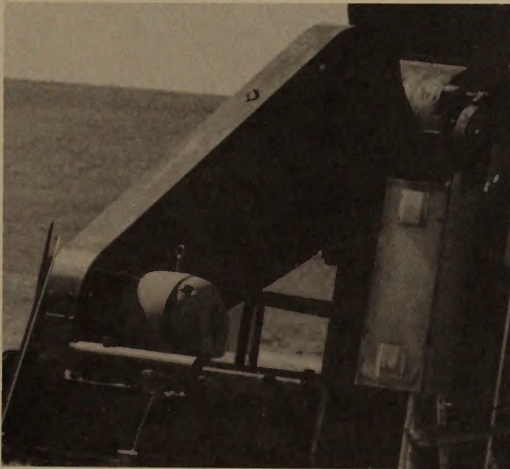
United States Department of the Interior  
Bureau of Land Management  
Rock Springs District Office

Pinedale Resource Area

# Big Piney/La Barge Coordinated Activity Plan Environmental Assessment

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The Bureau of Land Management is responsible for the balanced management of the public lands and resources and their various values so that they are considered in a combination that will best serve the needs of the American people. Management is based upon the principles of multiple use and sustained yield; a combination of uses that takes into account the long term needs of future generations for renewable and nonrenewable resources. These resources include recreation, range, timber, minerals, watershed, fish and wildlife, wilderness and natural, scenic, scientific and cultural values.

**BLM-WY-ES-91-008-4410**



January 17, 1991

Dear Sirs:

As much as we try to check and edit our documents, invariably, there are mistakes which sometimes appear in the final copy. Attached is an errata page for the Environmental Assessment for the Big Piney-LaBarge Coordinated Activity Plan. We have not included misspelled words or typesetting errors, but we have attempted to clear up the meaning of the printed document where mistakes occurred that may affect the reader's understanding of the material.

Team Leader  
Bureau of Land Management

(DRILLING PERIODS: NUMBER OF WELLS/PERIOD)

Drilling Period		Drillings/Period		Total Wells	
Date	Days	Date	Days	Drilling	Completion
8/1 to 11/15	107	11/15 to 2/1	78	1	1
8/1 to 12/15	137	12/15 to 3/1	78	1	1
8/1 to 11/15	107	11/15 to 3/1	106	10	7
8/1 to 11/15	107	11/15 to 3/1	106	11	8
8/15 to 11/15	94	11/15 to 3/15	121	12	8
8/15 to 12/15	104	12/15 to 4/15	121	12	8
8/1 to 1/1	93	1/1 to 3/1	61	15	10
1/1 to 12/31	365	None	0	18	13

Page 54, second paragraph in left hand column.  
Replace last sentence with the following sentence:  
Therefore, the total direct expenditures on the total area over the 10 years would be roughly \$131 million.

Page 54, third paragraph in right hand column.  
Replace second sentence with the following sentence:  
While drilling operations have been completed, it is difficult to estimate a start time.

Page 55, second paragraph under alternative 2 heading.  
Replace entire paragraph with the following text:  
Under this alternative, it is assumed that all new wells would be drilled in the study area over the next 10 years. This alternative had a majority of the new wells developed at double drilling rates, with the first well drilled in the first year. The remaining two wells would be drilled at the rate of about 10 per year over the next 9 years. The number of new wells would also be increasing during the 10 year period. For more information, refer to Chapter 12, Alternative 2.

Page 131, Appendix J, Summary of Drilling Operations, 1981 and 1982 Wells.  
Change figure under Alternative 2, Summary of Year 1, under Drilling Operations by Major Activity of Completion, 1981, from 4 to 20.



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Page vi, Maps

Replace Map 11 title with the following title:  
Special Management Areas

Page 32, Livestock Grazing Management

Replace paragraph with the following text:

There are currently 20,603 AUM's available each year for use by livestock operators in the CAP area. In 1990, BLM charged grazing fees of \$1.81/AUM. This would return about \$37,291 per year to the federal government if all 20,603 AUM's were utilized.

It is estimated in Wyoming Cow Country, Vol. 118, No. 4, Oct. 1990, that each AU of livestock production returned an average of \$52 in direct personal income to livestock industry households in 1987. Therefore, if this is assumed to be the current return to households and it is also assumed that the 20,603 AUM's in the CAP area support approximately 4120 AU's of livestock grazing annually, during a 5-month grazing season, the benefit to the personal income of livestock operator households would be over \$214,000 each year. The benefit of this livestock grazing to the personal income of Sublette County would be almost \$722,000 annually. The county calculation is based on an income multiplier of 3.37/\$1 of direct livestock sector household income.

Page 52, Drilling Periods: Number of wells/rigs/year table

Replace entire table with the following table:

**DRILLING PERIODS: NUMBER OF WELLS/RIG/YEAR**

<u>Drilling Period</u>		<u>Restricted Period</u>		<u>No. of Wells/Rig</u>	
Date	Days	Date	Days	Drilling	Completion
8/1 to 11/15	107	11/15 to 8/1	258	5	4
8/1 to 12/15	137	12/15 to 8/1	228	7	5
5/1 to 11/15	199	11/15 to 5/1	166	10	7
4/1 to 11/15	229	11/15 to 4/1	136	11	8
3/15 to 11/15	244	11/15 to 3/15	121	12	8
4/16 to 12/15	244	12/15 to 4/16	121	12	8
3/1 to 1/1	305	1/1 to 3/1	60	15	10
1/1 to 12/31	365	None	0	18	12

Page 54, second paragraph in left hand column

Replace last sentence with the following sentence:

Therefore, the total direct expenditures to the local area over the 10 years would be roughly \$131 million.

Page 66, first full paragraph in right hand column

Replace second sentence with the following sentence:

While seeding sagebrush has been successful, it is difficult to establish a stand from seed.

Page 79, second paragraph under Alternative B heading

Replace entire paragraph with the following text:

Under this alternative, it is assumed that 600 new wells would be drilled in the study area over the next 10 years. This anticipates that a majority of the area would be developed at 80-acre spacing during this period. One hundred (100) wells would be drilled the first year. The remaining 500 wells would be drilled at the rate of about 55 per year over the next 9 years. Two hundred (200) wells would also be reclaimed during the 10-year period. For more information, refer to Chapter II, Alternative B.

Page 151, Appendix J, Summary of Socioeconomic Impacts, Oil and Gas table

Change figure under Alternative C, Scenario 1 Year 1, Other Drilling Expenditures by oil/gas companies by destination (Millions \$) from 4 to 34.







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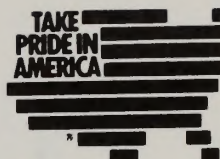
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BUREAU OF LAND MANAGEMENT  
WYOMING STATE OFFICE  
P.O. BOX 1828  
CHEYENNE, WYOMING 82003



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DEC 11 1990

Dear Reader:

This environmental assessment (EA) is presented to show the environmental impacts of six alternative coordinated activity plans (CAPs) for the Big Piney-LaBarge area.

Alternative A is the proposed CAP. It is based on decisions contained in the Pinedale Resource Management Plan (RMP). Alternatives to the proposed plan are based on input obtained through the scoping process. The scoping process involved public meetings and coordination with interest groups; industry; and other agencies; including local, State, and Federal.

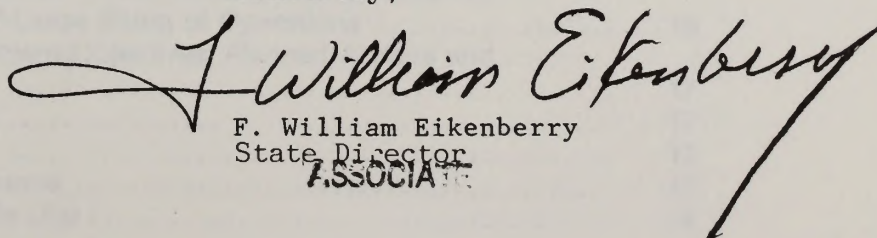
Alternative D is based on input from the oil and gas industry. Alternative F was developed with input from the environmental community. Collectively, the alternatives provide a range of reasonable management actions, resource allocations, and development levels. Public review and comment will be used by BLM to assist in selecting one, or a combination, of the alternatives as the coordinated activity plan.

This EA is open for public comment through Friday, February 15, 1991. Please send your comments to:

Mr. Bill McMahan  
Project Coordinator  
Rock Springs District Office  
P.O. Box 1869  
Rock Springs, Wyoming 82902-1869

Your comments and recommendations will be evaluated and fully considered before a CAP is adopted. Should the result mean amending decisions contained in the Pinedale RMP, a decision record will be published with a full description of the adopted CAP.

Sincerely,

  
F. William Eikenberry  
State Director  
ASSOCIATE





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# CHAPTER I

## BIG PINEY-LABARGE COORDINATED ACTIVITY PLAN ENVIRONMENTAL ASSESSMENT

### INTRODUCTION

#### Need for the Proposed Action

In December 1988, BLM's Pinedale Resource Area (RA) land use plan was completed with the release of the Pinedale Resource Management Plan (RMP) and Record of Decision (ROD). The RMP is a multiple-use plan that provides management direction for all Federal resources for an area of approximately 931,000 acres of public surface and 1,185,000 acres of Federal mineral estate in western Wyoming. The RMP established management direction for public lands and resources in the Pinedale RA in the following categories:

- Allowable resource uses and minimum or maximum levels of production or use to be maintained;
- Resource condition goals and objectives;
- Program constraints and general management practices that affect planned actions, including consideration of social and economic conditions, demands, and constraints;
- Support actions necessary to achieve specific resource goals and objectives;
- Intervals or standards for monitoring or evaluating the plan to determine its effectiveness or the need for amendment or revisions.

An important element in developing this plan was active participation by the public, industry, other Federal agencies, and State and local Governments in making the land use choices.

The Pinedale RMP identified an area where more detailed and site specific management plans are needed. This area is located in the western part of the Pinedale RA, near Big Piney, Marbleton, and LaBarge, Wyoming (see general location map).

The area contains diverse public land resource values and several conflicting uses. This has created a complex management situation making it difficult to develop and implement any individual resource management program. The area is comprised of approximately 197,000 acres located between the Green River to the east and the foothills of the Wyoming Range to the west.

The north and south borders of this area are in the vicinity of North Piney Creek on the north and LaBarge Creek on the south (Map 1). The area has been identified because of conflicts between resources such as wildlife, watershed, livestock grazing, water quality, and oil and gas development.

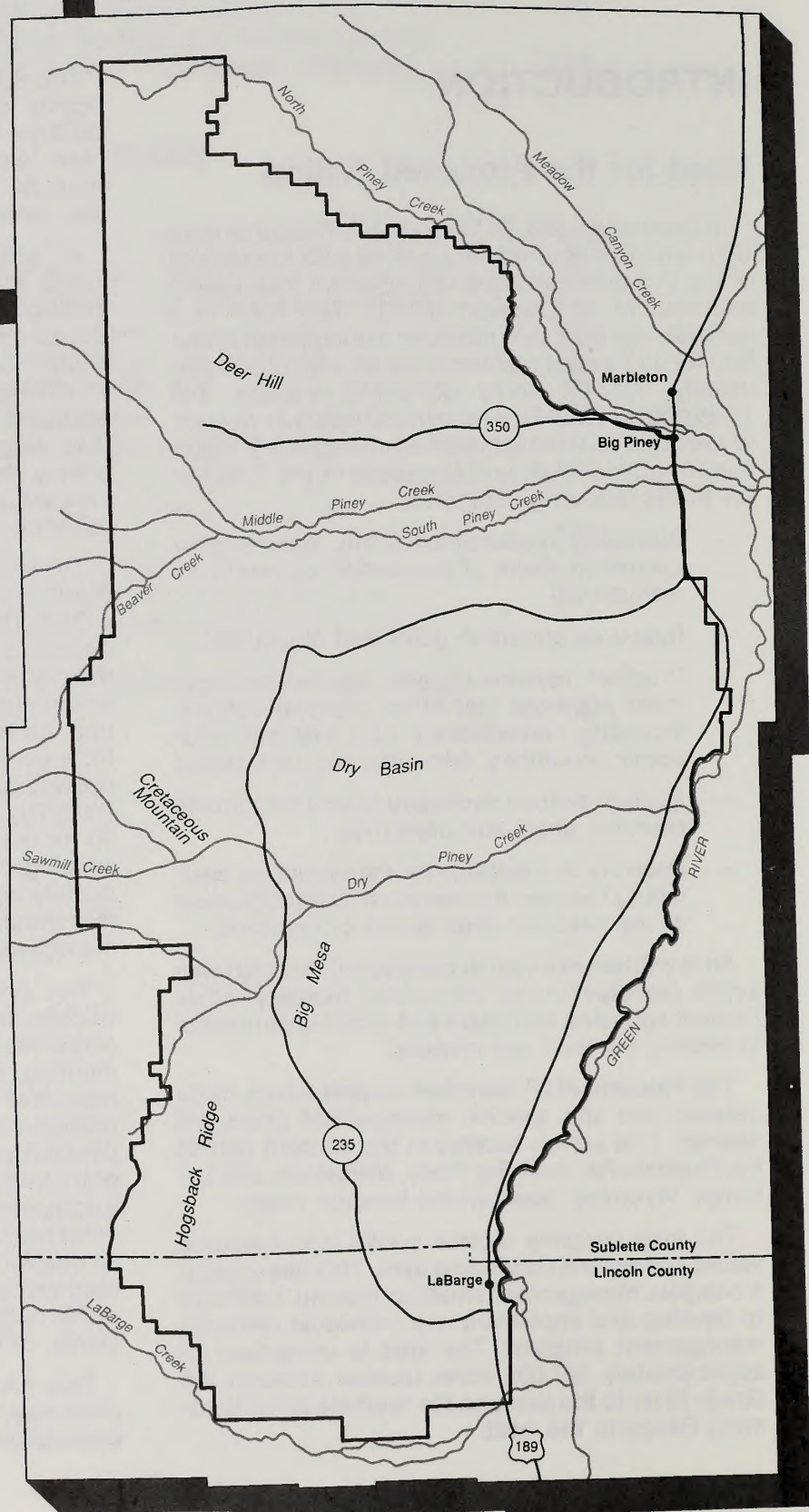
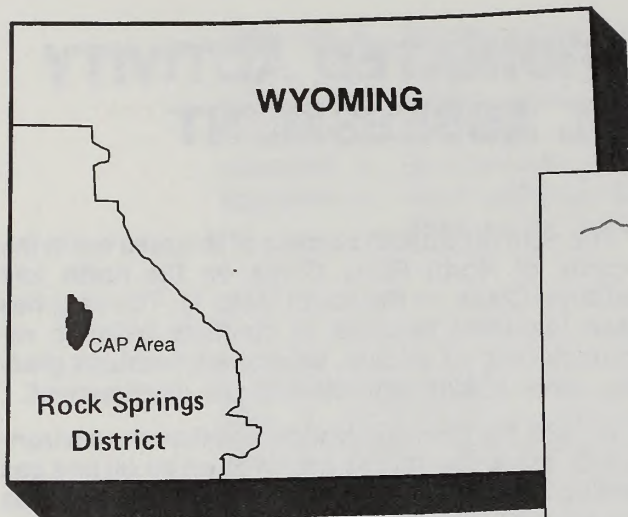
In 1989, the Decision Notice based on the environmental assessment (EA) prepared on an oil and gas drilling proposal for 37 wells (Enron Oil and Gas Company) within the Big Piney-LaBarge area concluded that a coordinated activity plan (CAP) must be developed before further intensive development occurred within this area. The purpose of the CAP is to integrate the management of all resource programs. Part of the management decisions for the area will address guidance for the development, reclamation, and abandonment of mineral activity.

To resolve resource management concerns in the Big Piney-LaBarge area, the Pinedale RA prepared a CAP. The draft CAP integrated the Pinedale RMP decisions, as they pertain to the CAP area, in a manner which attempted to balance diverse uses and minimize conflict. The draft CAP was based not only on RMP management direction, but on input from user groups [oil and gas operators, livestock operators, Wyoming Game and Fish Department (WGFD)]. The draft CAP was distributed to the public for comment in March 1990. It also served as a scoping document, to identify concerns not adequately addressed in the draft CAP or new issues that should be addressed, and to identify alternative management opportunities that should be analyzed.

The primary resources involved are minerals, wildlife, livestock grazing, watershed, and water resources. However, the BLM recognizes that implementing actions associated with any of these resources could directly or indirectly affect other resource values and uses. The RMP management direction pertaining to these other resources are integral components of the CAP. This approach ensures a comprehensive, fully integrated activity plan. The other resource values and uses are riparian/wetland, air quality, forest management, visual resources, off-road vehicle use, cultural resources, and lands and realty actions (i.e. rights-of-way, land use adjustments, or easements).

This EA analyzes alternative CAP management proposals, including No Action. It will also analyze cumulative impacts of human activities within the





**General Location Map  
Big Piney - LaBarge  
Coordinated Activity Plan**



## INTRODUCTION

CAP area, including socioeconomic impacts. The EA provides the BLM with the information it needs to make an informed decision on the best integrated resource management alternative tailored to the Big Piney-LaBarge area.

### Conformance with Land Use Plan

The proposed CAP, which is Alternative A in this EA, conforms with the decisions in the Pinedale RMP (December 12, 1988). Alternative A would implement the Pinedale RMP while other alternatives would require an amendment to RMP decisions.

The RMP provides general management prescriptions (rules or directions) for the renewable and non-renewable surface and subsurface resources and the allocation of uses on public lands in the Pinedale RA. The Pinedale RMP responds to four general issues: (1) conflicts between surface-disturbing development activities and other land and resource uses, (2) adequacy of resource accessibility and manageability, (3) conflicts between consumptive and nonconsumptive uses, and (4) conflicts between off-road vehicle (ORV) use and other land and resource uses.

The approved RMP represents a selection of management actions which resolve the planning issues and provide for multiple use management of the public lands and resources in a combination that will best meet foreseeable needs and maintain environmental integrity.

The CAP would refine the general management decisions made in the RMP to site-specific management decisions applicable to the CAP area.

### Environmental Analysis Process

The BLM, as required by the National Environmental Policy Act (NEPA), and the Council for Environmental Quality (CEQ), must analyze actions proposed in the development of activity plans to determine and identify the environmental effects and their impact on the human environment (40 CFR, Parts 1500-1508).

The Big Piney-LaBarge CAP Environmental Assessment (EA) is tiered to the Pinedale RMP Final Environmental Impact Statement (FEIS). The EA is specific, concentrating on the application of management direction prescribed by the broader Pinedale RMP/FEIS. The Pinedale RMP/FEIS is available for public review at the BLM offices in Pinedale, Rock Springs, and Cheyenne, Wyoming.

This EA is not a decision document. It analyzes the environmental impacts of BLM's Proposed Action and each alternative. The EA, through interdisciplinary preparation and review, consideration of reasonable alternatives, and public participation, serves as a vehicle for: (1) determining the significance of environmental impact, (2) assisting the decision making process, (3) deciding whether an EIS is necessary, and (4) identifying and developing appropriate mitigation measures to minimize identified environmental impacts. Each alternative will be reviewed in order to make an informed decision, which may include all or parts of one or more of the analyzed alternatives.

The final decision will appear in a Decision Record after analysis of public input from the review period provided on this assessment and from public meetings in the study area. Should the analysis result in changing decisions made in the RMP, an RMP amendment will also be part of the final Decision Record.

This EA analyzes the impacts of alternative coordinated activity plans. It is important to recognize that this EA is not the final environmental review upon which approval of all actions in the area will be based. Following the selection of a CAP, and prior to authorizing site-specific actions (e.g., BLM proposed fencing or water developments, industry proposed pipelines, applications for permit to drill), the appropriate level of environmental analysis will be performed and documented in compliance with NEPA, and Department of the Interior and BLM Manuals. In addition, there may be additional levels of planning and analysis documentation which may be necessary at the program/project level.

### Land Status, Legal, and Policy Considerations

#### Land Status

The surface area involved within the CAP area is comprised of 196,841 acres. For a breakdown of surface and mineral ownership, see Page III-1.

#### Management Direction

The Pinedale RMP provides the management direction for BLM administration of public lands and minerals within the CAP area. Specific management direction from the RMP is presented as Alternative A, BLM's Proposed Plan in Chapter II.



# INTRODUCTION

## Authorizing Actions

CAP planned actions will require further authorization before on-the-ground implementation can occur. BLM will be responsible for the planning, approval, and execution of all projects performed on BLM administered public lands.

BLM initiatives will require various processing steps including feasibility analysis, job documentation report preparation to provide for appropriate engineering or other support review, programming and budgeting for yearly scheduling and for the obligation of funds to carry out the project, and coordination necessary with other agencies, landowners, etc.

Non-BLM initiatives, such as applications for rights-of-way, applications for permit to drill (APDs), mineral material sales (sand or gravel), livestock grazing licenses, which involve public lands, will require various Federal, State, county, or local authorizations, including site-specific NEPA analysis of the specific planned action, and necessary coordination with other agencies, landowners, etc.

## SCOPING PROCESS

The BLM announced the intent to prepare a CAP in April 1989 when the public was informed of the decision to approve Enron Oil and Gas Corporation's 1989 drilling proposal. This decision included the requirement for BLM to prepare a coordinated activity plan to be approved before authorizing additional intensive in-field development. At that time, the public was invited to participate in developing the CAP.

On March 20, 1990, the draft plan, called the "Big Piney-LaBarge Coordinated Activity Plan" (CAP), was distributed to the public for a 30-day comment/scoping period. On April 5, 1990, an open house was held and a public meeting was conducted in Marbleton, Wyoming. Individual meetings were held with affected ranchers, oil and gas lessees/operators, county commissioners, and the WGFD. A total of 38 comment letters were received during the scoping period.

## Issues

All comment letters, public meeting, and open house comments received on the Draft CAP were thoroughly reviewed and summarized for consideration in the environmental analysis. The letters and summary are available for public review in the Pine-dale RA office or the Rock Springs District Office. The resulting issues identified are as follows:

- Seasonal wildlife restrictions.
- Mule deer population levels and habitat needs.
- Carrying capacity and utilization levels.
- Range/habitat improvements.
- Surface disturbance/reclamation.
- Level and rate of oil and gas development.
- Off-road vehicle restrictions.
- Water quality monitoring.



## CHAPTER II

# DESCRIPTION OF THE PROPOSED COORDINATED ACTIVITY PLAN AND ALTERNATIVES

The proposed plan and alternatives are variations of the proposal to develop and implement a coordinated activity plan (CAP) for the Big Piney-LaBarge oil and gas development area. The BLM's proposed plan (Alternative A) represents a CAP based on implementation of the Pinedale Resource Management Plan (RMP) Record Of Decision (December 1988) as applied to the CAP area. Alternatives B, C, D, E, and F represent CAP variations based on issues identified by the public, interested groups, and industry during the open house and public meeting held April 5, 1990, subsequent meetings with interest groups, and written comments.

The description of the proposed plan and alternatives is presented in the same sequence for each alternative as follows:

## OBJECTIVES

This section provides a description of the objectives (resource management goals) for each resource activity.

Objectives are based upon the Pinedale RMP management objectives but tailored to the CAP area.

## PLANNED ACTIONS AND REQUIREMENTS

This section provides a description of the planned action(s) that BLM would implement to resolve or satisfy an issue(s) or a present or potential management problem, and to meet stated resource objectives. This section also provides a description of the requirements (confined, restricted, or limited actions) that are derived from the Pinedale RMP Record of Decision. Planned actions are guided and directed by the objectives and requirements. The requirements are conditions to be applied to any actions or authorizations as needed.

**Please Note:** Usage of the words "will" or "would" does not imply that any decision has been made or that any proposal will be implemented. "Will" is used

in Alternative A because, in most cases, this represents continuing the existing management situation.

## ALTERNATIVE A - CAP Based on Implementation of Pinedale RMP Decisions

Alternative A implements the current management decisions specified in the Pinedale RMP as they apply to the CAP area. This alternative emphasizes implementation of resource management and protection decisions contained in the Record of Decision (ROD) and Approved Plan for the Pinedale RA (12/88). They were analyzed in the DEIS/FEIS. Alternative A provides for multiple use management of the public lands and resources to meet foreseeable needs and emphasize environmental integrity. This Environmental Assessment (EA) is tiered to and references applicable portions of the RMP/FEIS. Alternative A is also considered by BLM as the "No Action" alternative for this analysis as defined by the CEQ regulations.

Consequently, Alternative A provides continuation of current management decisions in the approved RMP, and proposes no new actions. Decisions from the approved RMP are currently being implemented. The FEIS prepared on the Pinedale RMP considered continuation of the historical management direction and levels (pre-1987) as the "No Action" alternative.

Under Alternative A, the CAP provides for 300 new wells to be drilled over the next 10 years. This assumes that development will be allowed to continue to the extent necessary to efficiently develop the area. BLM assumes, in order to maintain consistency with the other alternatives, that 50 wells would be drilled the first year. The remaining 250 wells would be drilled at the rate of about 28 per year over the next 9 years. Two hundred (200) wells would also be reclaimed over those 10 years. (**Note:** This represents industries best estimate of the total number of wells which could be reclaimed over the 10-year study period. It is based upon the historical experience in the field, as well as on the fact that most of the gas wells have a long economic life.)



# PROPOSED COORDINATED ACTIVITY PLAN AND ALTERNATIVES

It should also be noted that in each of the first five alternatives analyzed, a reasonably high number of wells was predicted to be drilled in the first year. However, since this number will be based upon energy demand, it could occur in any of the 10 years under study. The last alternative has a different basis for analysis, and consequently there is no high number of wells.

The detailed elements of this alternative are presented in the following narrative.

## RESOURCE MANAGEMENT OBJECTIVES, PLANNED ACTIONS, AND REQUIREMENTS

### Minerals - Oil and Gas

#### Objectives

Continue to permit, over the next 10 years, the development of oil and gas reserves within the plan area. Permit the plugging of wells with no potential for future use, and the abandonment and reclamation of the associated well pads, access roads, pipelines, and power lines.

#### Planned Actions and Requirements

Operators, over the next 10 years, will abandon (plug and reclaim) approximately 200 wells that have no potential for future use. Abandoned wells will be plugged in accordance with BLM-approved procedures to protect freshwater aquifers. These well locations, along with the locations of associated access roads, pipelines, and power lines, will be recontoured to natural shape and seeded to stabilize the soil with the ultimate objective of reestablishing wildlife habitat and livestock grazing. See Map 2 for the location of existing wells and roads.

Producing wells in the CAP area will be maintained in their present condition and continue to produce oil and gas for the life of the wells. Roads and other facilities needed to produce the oil and gas reserves will be maintained by the lease or unit operator for the life of the field.

All activity associated with drilling, completing, and producing oil and gas wells will be in conformance with permit conditions of approval (COAs).

Geophysical exploration notices of intent will be evaluated on a case-by-case basis. Appropriate lim-

itations will be applied, including vehicle use restrictions, seasonal limitations, and explosive charge limitations. Generally, all authorizations will be issued with appropriate application of the guidelines for surface disturbing activities as presented in Appendix A.

### Minerals - Solid Leasable

#### Objectives

The planning area will be open to consideration for exploration, leasing, and development for all solid leasable minerals including coal and oil shale.

#### Planned Actions and Requirements

All activities will be conducted in accordance with Guidelines For Surface Disturbing Activities (Appendix A).

### Minerals - Locatable

#### Objectives

On Federal lands and minerals, the CAP area will be kept open to mineral location.

#### Planned Actions and Requirements

Accept, process, and record mining claims. Surface disturbing activities on mining claims requires a notice submitted to BLM for cumulative surface disturbances of 5 acres or less. A plan of operations is required for surface disturbances of more than 5 acres.

### Minerals - Salable

#### Objectives

Salable minerals (e.g., sand and gravel) will be made available on public lands.

#### Planned Actions and Requirements

Applications for mineral sales will be analyzed and processed on a case-by-case basis and appropriate surface disturbance mitigation requirements will be included in permits.



# PROPOSED COORDINATED ACTIVITY PLAN AND ALTERNATIVES

## Reclamation/Reclamation Monitoring

### Objectives

Achieve soil stability through the use of native species to reestablish vegetative ground cover on reclaimed areas; reduce runoff and erosion; restore wildlife and livestock forage and improve wildlife habitat condition; and restore visual quality to meet established visual resource management objectives on all areas of surface disturbance.

### Planned Actions and Requirements

The reclamation of all disturbed areas will comply with the reclamation procedures described in Appendix A.

BLM will require reclamation plans for proposals involving surface disturbance. Oil and gas proposals will comply with 43 CFR 3164, Onshore Oil and Gas Order No. 1, Part III G, 4(b)(10); other rights-of-way will comply with 43 CFR 2802.4(h) or 2882.3(m).

Abandonment (plug and reclaim) of 200 existing wells/locations and 110 miles of road (total of approximately 810 acres) will comply with the standard reclamation procedures described in Appendix A. See Map 2 for road and well locations and Appendix E for reclamation calculations.

All reclamation will be monitored by BLM to strive for reaching the following revegetation and reclamation goals:

- Immediate site stabilization to limit wind and water erosion.
- Implementation of noxious weed control in cooperation with County Weed and Pest Control Agent.
- Reestablishment of vegetation consistent with site objectives for livestock and wildlife with vigorous self-sustaining stands of desirable plant species.
- Reduction of visual contrast and enhancement of aesthetic values.

Monitoring reclamation will be a joint effort between the BLM and the lessee/operator/permittee. Monitoring procedures for reclamation, water quality, wildlife, and rangeland vegetation are described in Appendix F.

## Monitoring

### Objectives

Ensure attainment of the construction, operation, maintenance, and reclamation objectives associated with surface disturbing activities; ensure attainment of the vegetative resource management objectives for the watershed, wetland/riparian, wildlife and livestock resources; and conform with the decisions of the Pinedale RMP.

### Planned Actions and Requirements

Monitoring will be conducted and guided by procedures discussed in Appendix F and as required by both environmental and BLM regulations Code of Federal Regulations (40 CFR, Parts 1500-1508, and 43 CFR 1600, 4120).

## Wildlife Habitat

### Objectives

Maintain and improve delineated crucial winter range in the CAP area as an essential component to the Wyoming Range mule deer and elk populations; provide winter and transitional habitat to support and maintain healthy mule deer and elk populations; protect moose habitat; mitigate habitat losses associated with the development of energy resources; protect sage grouse breeding and nesting habitat; protect raptor nesting habitat; enhance pronghorn habitat; maintain, enhance, and restore riparian habitat and associated streams; and protect threatened and endangered species habitat.

### Planned Actions and Requirements

#### Wildlife Habitat and Seasonal Protection

No activities or surface use would be allowed from November 15 to April 30 within crucial big game winter range (Maps 7 and 8) to protect important big game winter habitat.

No activities or surface use would be allowed from February 1 to July 31 within certain areas (Map 8) to protect important raptor and/or sage grouse nesting habitat. The same restriction can apply to defined raptor and game bird winter concentration areas from November 15 to April 30.



# PROPOSED COORDINATED ACTIVITY PLAN AND ALTERNATIVES

Exceptions to the seasonal limitation in any year may be approved in writing by the Authorized Officer, see Appendix G. Typically, when an oil and gas drilling operation starts, it is allowed to be completed. Decision points for shutdown occur between pad construction and drilling, and between drilling and well completion.

No activities or surface use would be allowed on areas identified as having wildlife habitat or wildlife values which cannot be protected with seasonal restrictions. Examples include sage grouse leks and raptor nests. A ¼ mile buffer may be required, but distances may vary depending on the nature of the project and sensitivity of the habitat.

For proposed activity within sage grouse breeding/nesting areas, a search of suitable sage grouse nesting habitats (within the proposed project area) will be conducted. If nests are found, the proposed activity would be delayed until after the nesting period.

Prior to conducting any surface-disturbing activities on an area known or suspected to be essential habitat for threatened or endangered species, the lessee/permittee will be required to conduct inventories or studies in accordance with BLM and U.S. Fish and Wildlife Service guidelines to verify the presence or absence of this species. In the event a threatened or endangered species is identified, the lessee/permittee will be required to modify operations to comply with protection requirements for the species and its habitat.

The US Fish and Wildlife Service (FWS) has determined that water depletions from the Colorado River System (Green River), including any recharge sources could jeopardize the Colorado River threatened and endangered species. Such depletions (e.g. construction and drilling) will require a fee for the conservation of those species.

Wildlife escape devices will be installed and maintained in all water troughs.

Parts of the CAP area will be subject to a no winter travel limitation (November 15 to April 30) to protect wintering wildlife on an as needed basis. (See Maps 7 and 8.)

A cooperative plan will be developed by the BLM, WGFD, other interest groups, and oil and gas industry within 2 years of completion of the CAP decision document to identify and design mitigation opportunities for habitat losses.

## **Decadent Sagebrush Vegetation Treatment**

Approximately 10,865 acres of old, decadent sagebrush-grassland and sagebrush-salt desert shrub vegetation types, within crucial winter range on public lands, will be treated by the year 2000. About 1,900 acres are between North and South

Piney Creeks, and 8,965 acres are between South Piney and LaBarge Creeks. If these treatments meet the desired objectives, the program will be continued on additional acreage through the year 2010.

Up to 3,900 acres of old, decadent sagebrush-grassland vegetation with mule deer transitional, winter, and yearlong range on public lands will be treated by the year 2000.

Treatment of additional transitional, winter, and yearlong range will continue if the desired objectives are met. Desert shrub communities of Gardner's saltbush and winterfat in need of rejuvenation will be inventoried to identify suitable areas and methods for treatment by 1995.

## **Mountain Shrub Vegetation Treatment**

Approximately 650 acres of mountain shrub association will be treated to rejuvenate, perpetuate, and potentially expand the mountain shrub community.

## **Saltbush, Winterfat, Bud Sage Management**

Saltbush, winterfat, and bud sage key mule deer winter habitat type will be treated after inventory and identification.

Livestock grazing will be managed to reduce utilization on saltbush, winterfat, and bud sage through deferred grazing systems.

## **Aspen Stand Treatment**

Aspen stands located in transitional, winter, and yearlong range in need of rejuvenation, estimated at about 100 acres, will be inventoried and treated by various methods. There are about 1,054 acres of aspen association in the CAP.

## **Reclamation Seeding**

Revegetation of disturbed areas will include seeding of preferred deer forage including fourwing saltbush, Wyoming big sagebrush, and winterfat, as well as other adapted shrub seeds appropriate in reclamation areas.

## **Mountain Shrub Protection**

Important mountain shrub communities (3,937 acres) will be protected and maintained by avoiding them as much as possible for road, well pad, and pipeline construction (see Map 6 for the location of mountain shrub communities). Where these communities cannot be avoided, reclamation will include planting containerized shrubs such as true mountain mahogany.



# PROPOSED COORDINATED ACTIVITY PLAN AND ALTERNATIVES

## Aquatic Management

Streams currently or potentially capable of sustaining fish (i.e., Pinegrove, Sawmill, Fogarty, and Black Canyon) will be managed in accordance with BLM's East Front Aquatic Habitat Management Plan and the WGFD Colorado River Cutthroat Trout Management Plan.

The wetland/riparian zones will be protected and maintained by avoiding them as much as possible for road and pipeline construction.

## Livestock Grazing Management

### Objectives

To establish appropriate vegetation and livestock grazing management practices to maintain or improve the vegetative resource; to maintain or improve ecological range condition and maintain or increase forage for livestock grazing; to provide for the maintenance or improvement of wildlife habitat, watershed values, and riparian areas; to reduce accelerated erosion in the Big Mesa pasture of the North LaBarge Common Allotment; to eliminate continuous livestock grazing and provide periodic deferment to all portions of the North LaBarge Common and Calpet Common Grazing Allotments; to reconcile the discrepancy between the current allocation and the forage shown to be available on the 1961-62 range survey; to establish accurate livestock stocking rates and subsequent forage allocation among the livestock operators in North LaBarge Common Allotment; to improve livestock distribution; to maintain or improve riparian areas for livestock forage production, water availability, and soil stabilization; and to mitigate livestock forage losses associated with the development of energy resources.

Rangeland monitoring studies will be installed on all "I" category allotments, and on "M" and "C" category allotments as needed. Monitoring intensity will be greater on "I" allotments than on "M" or "C" allotments. Key areas have been identified for monitoring, but only for pastures of North LaBarge Common and Calpet Common Allotments (Appendix F). No changes in livestock numbers or management will be made on any allotment until sufficient monitoring data is available. Any changes in livestock use will be implemented by either agreements with livestock operators, which is preferred, or by issuing livestock grazing decisions.

### Planned Actions and Requirements

Allotment management plans (AMPs) for the allotments within the CAP area will not be completed as

part of this plan. The reason is that parts of some of the allotments are outside the CAP area, and additional considerations are necessary for resources in those parts of the allotments. Most of the range management actions and adjustments will be implemented during the AMP development process. Range improvements described in Appendix H may be implemented prior to completion of the AMP.

## Deer Hills Allotments

Range improvements such as stockwater reservoirs will be implemented to alleviate gully erosion and provide better livestock distribution within the Deer Hills Individual and Dan Budd Deer Hills Allotments.

Existing water control structures in the Deer Hills area will be reevaluated to see if they are functioning and able to meet new objectives. Some may be reconstructed and others abandoned. Reservoir reconstruction and abandonment will be designed to correct poorly located existing reservoirs, act as silt traps, and provide adequate livestock water.

New reservoirs will be required upstream to ensure the success of the reconstructed reservoirs. Although the locations have not been specifically identified, new reservoirs may be proposed in the Deer Hills area for watershed purposes. A small riparian enclosure and some prescribed burning will also be proposed for this area.

## Upper North LaBarge Allotment

The Deadline Ridge water pipeline and Spring Creek water pit, located in the Hogsback pasture, will be reconstructed. Water development in this pasture will enhance the distribution of livestock and help achieve the objectives for the allotment management plan (AMP) to be completed.

## North LaBarge Common Allotment - Forage Allocation and Recovery

The proposed vegetation monitoring will be designed to establish accurate livestock forage availability for this allotment. A reevaluation of available forage will be completed to determine if there is a need for making adjustments in the current forage allocation.

BLM will establish accurate stocking rates and forage allocation among the range users in North LaBarge Common Allotment in the following manner:

- Using a combination of actual use data, climatic data, utilization measurements on key areas, and utilization pattern mapping.



## PROPOSED COORDINATED ACTIVITY PLAN AND ALTERNATIVES

- Using annual actual use and utilization data, prorated against the total allocated privileges, to establish proper allocation.
- Monitor utilization, when livestock use of key plant species utilization reaches 50 percent of the current year's growth, remove the livestock from the pasture.
- Intensified grazing management consisting of a "deferred grazing system," will be applied to the North LaBarge Common Allotment.

The active use licensed for the North LaBarge Common Allotment is listed in Appendix K.

As projects are developed, the grazing system may be modified or refined based on monitoring data. Every attempt has been made to develop an effective and efficient grazing scheme that benefits both the range resources and facilitates the permittee's grazing operations.

### **North LaBarge Common Allotment - Livestock Distribution**

Big Mesa pasture will be subdivided into four smaller pastures, creating 11 pastures in the North LaBarge Common Allotment (Map 10). Four sections of drift fence and several new and reconstructed water developments will be needed to permit a deferred management system for spring and fall use in a large area of traditional spring grazing. Appendix H describes all of the rangeland improvements proposed for North LaBarge Common Allotment.

The four proposed fences (3.65 miles) will be three-wire fences, constructed to BLM fencing standards for wildlife areas, designed to accommodate movement of deer and other wild animals. Critical portions of these fences may need to be of the let-down type fence to provide for deer movement.

Livestock grazing will be decreased in the following areas that currently receive excessive use: northwest corner of Big Mesa pasture in the Dry Piney and Fogarty Creek areas, Dry Basin Draw in Cretaceous pasture, the entire east side of Trail Ridge pasture, and the area near Pinegrove Creek enclosures in Pinegrove pasture.

Livestock will be increased in the areas of low forage utilization. Areas that could absorb more livestock utilization include: much of the east side of Big Mesa pasture that is currently short on water facilities, the western part of Pinegrove pasture on Deadline Ridge, and the northern part of Cretaceous pasture.

Salt will be placed to improve livestock distribution. Salt blocks will not be placed within 500 feet of live water, wetlands, riparian areas, or reclaimed areas.

BLM will monitor plant utilization and livestock will be removed when use of key plant species reaches 50 percent of the current year's growth.

### **North LaBarge Common Allotment - Summer Pasture**

Cretaceous pasture will be used in a deferred system with Trail Ridge pasture. One additional water well in Cretaceous pasture will be needed to accomplish this goal. East Chimney, West Chimney, and the four pastures to be created from the existing Big Mesa will be managed under a deferred system for spring and fall use.

### **Calpet Common Allotment**

Black Canyon and Calpet pastures will become an allotment separate from the North LaBarge Common Allotment. The new allotment will be referred to as the Calpet Common Allotment.

JF Ranch plans to fence the State land to create an additional pasture. Plans to fence the Calpet pasture (east to west), to create a north and south pasture, may be pursued if adequate water is developed on the south side. The active use licensed for the Calpet Common Allotment is listed in Appendix K.

### **O'Neill Individual Allotment**

Six hundred and forty (640) acres will be treated. This project is designed to increase livestock forage and improve wildlife habitat. The livestock operator will provide the labor and equipment to complete this project.

### **Riparian Area Management**

In the North LaBarge Common and Calpet Common Allotments, the following riparian areas will be improved and maintained for forage production, water availability, and soil stabilization:

Dry Piney Creek, Fogarty Creek, Dry Basin Draw, Beaver Creeks, Pinegrove Creek, Sawmill Creeks, Black Canyon, and Beaver Dam Creek.

Forage utilization will be monitored in these riparian areas. Utilization will be limited to 40 percent of the current year's growth on Dry Basin Draw, Beaver Creek, and Dry Piney Creek, and 50 percent on the other riparian areas.

The planned range improvements (i.e., waters, fences) and deferred grazing system will enhance implementation and successful attainment of riparian area improvement.



# PROPOSED COORDINATED ACTIVITY PLAN AND ALTERNATIVES

All actions will comply with Executive Order, E.O. 11988, *Floodplain Management*, E.O. 11990, *Protection of Wetlands*, and the State of Wyoming Department of Environmental Quality water quality standards.

Livestock salting areas will be at least 500 feet from any riparian areas or surface water. Activities that affect or are affected by riparian values will take into account riparian objectives. The wetland/riparian zones will be protected and maintained by avoiding these areas as much as reasonably possible for road and pipeline construction.

## Groundwater

### Objectives

To determine the presence and extent of groundwater contamination in the Big Piney-LaBarge area. Determine lateral and vertical continuity of various water-bearing zones and possible avenues of contaminant movement. Clean up any contamination. Refine the ongoing base level aquifer system study to better understand the Wasatch Formation and Darby thrust Paleozoic section aquifers. Continue casing and cementing programs. Identify potential water supplies which could be used in range and wildlife management programs.

### Planned Actions and Requirements

A Cooperative Agreement between BLM and the oil and gas operators will be completed to initiate a 3-year groundwater monitoring program in the Big Piney-LaBarge producing area.

The Cooperative Agreement, monitoring procedures (Appendix F), and the monitoring locations (Map 3) will guide the monitoring study. The monitoring program components include:

- Operation of the program, information collected, and any contamination problems or cleanup will be coordinated with the Water Quality Division of the Wyoming DEQ.
- Monitoring will concentrate on the upper aquifers of the Wasatch Formation and aquifers within the Paleozoic carbonate section of the Darby thrust plate.
- Existing water wells (Map 3) used by the oil and gas industry and town water supply wells in LaBarge, Big Piney, and Marbleton will be the main sampling sources.
- Thirty sample sites are included in the program. Cost will be shared by the oil and gas operators involved based on the number of oil or gas wells each operates.

- Sample collection will be the responsibility of the BLM. Samples will be collected twice yearly (May and September) and submitted for analysis. BLM will distribute the data to the operators and to the Wyoming DEQ. The data will also be available to the public.
- If significant contamination is found, more extensive analysis will be required, but only in the area where it is located. The operator from whose facilities contamination is determined to originate (if this can be determined) would be responsible for source detection and cleanup in a manner determined and agreed upon by the operator(s), the DEQ, and the BLM.
- At the end of 3 years, a review of the program will be completed to summarize findings, discuss problems, and present recommendations for future actions and monitoring program modification as necessary.

Drilling and plugging of wells would continue to be permitted in accordance with the procedures and constraints detailed in Appendix B, Methods of Protection of Ground Water During Drilling and Abandonment Operations.

## Soils and Watershed

### Objectives

Improve and maintain watershed conditions; maintain or enhance the quality of surface water; protect all perennial, intermittent, and ephemeral drainages from the impacts of surface disturbance; reduce salinity and sediment loading in all perennial streams and maintain or improve condition of wetlands; and conserve soil by maintaining stability and productivity.

### Planned Actions and Requirements

#### Watershed Conditions

The design, placement, and reclamation of roads, well locations, range improvements, and pipelines will be given paramount consideration to ensure sedimentation and salinity contributions to stream channels in the area do not exceed EPA standards.

Livestock watering facilities will be constructed away from the riparian and wetland areas to reduce grazing pressure. This, coupled with implementation of the deferred grazing system, will help alleviate some of the impact to the riparian areas.

Past erosion problems related to road and well pad placement and grazing will be corrected by applying



# PROPOSED COORDINATED ACTIVITY PLAN AND ALTERNATIVES

the constraints specified for surface disturbing activities. BLM standard procedures have been and will continue to be implemented.

These management practices involve:

- Reduced grazing in riparian and wetland areas.
- No drilling in floodplain and wetland areas.
- No surface disturbance within 500 feet of surface water (livestock waters included) and/or riparian areas.
- Graveling, redesign, or closure restrictions on oil field roads and ORV use.
- No construction during periods when soil material is saturated or when watershed damage is likely to occur.

## Road Locations

No surface disturbance will be allowed within 500 feet of surface water (livestock waters included) and/or riparian areas. A 50 to 100 feet buffer strip will be provided between any surface disturbance (road, pad, or pipeline locations) and intermittent or ephemeral drainages. This will allow a vegetative buffer strip to help retard the movement of salt and sediment into the channel.

Surface disturbance within 500 feet of surface water or within the buffer strip adjacent to intermittent or ephemeral drainages may be allowed by the Authorized Officer, provided the applicant's plans (e.g., engineering design, geological/technical analysis, etc.) demonstrate that the disturbance can be accomplished without causing increased erosion and sedimentation.

## Cumulative Surface Disturbance

On highly erodible soils (Map 5 and Appendix D) with slopes of 10 percent or greater, the surface area of disturbance will be limited to no more than 10 percent of the watershed. Surface disturbance on slopes greater than 10 percent may be allowed by the Authorized Officer, provided the applicant submits detailed plans (e.g., engineering design, geotechnical analysis, etc.) demonstrating that the disturbance impacts can be mitigated.

Implementation of the Tip Top watershed management plan will be continued until natural vegetation density and gully reclamation is attained.

## Baseline Monitoring

The USGS water quality gaging station on Dry Piney Creek, Sec. 27, T. 28 N., R. 113 W., was reactivated by the USGS in April 1990. Contingent upon the availability of BLM funds, it will be monitored by the USGS from April to September for the next 5 years to get a temporal representation of water quality. If BLM funds are unavailable to provide to the USGS, the BLM will complete the monitoring in-house.

A sediment sampler will be installed in an undisturbed watershed located in T. 28 N., R. 113 W., Sections 23, 24, 25, 26, 35, and 36 (Map 11), to determine the level of sediment load of an undisturbed watershed in the CAP area. If temporal data suggests that the sediment load has exceeded 10 percent and the current management practices are not alleviating this level, then it is possible that surface disturbing activity in the area will have to be reduced until the sediment load is at an acceptable level.

No surface disturbance will be authorized by BLM in the control watershed. This watershed is to represent an undisturbed condition and is needed for future comparisons of management practice effectiveness. Surface disturbance in this watershed would limit the utility of the data collected.

## Air Resources

### Objectives

Coordinate air resource management activities with the Wyoming DEQ Air Quality Division, local officials, and other land management agencies (e.g., USFS, FWS).

### Planned Actions and Requirements

Within the next year, BLM Rock Springs District will coordinate or aid in the facilitation of the design of a study plan to assess the status of air quality/visibility in the CAP area. Under technical advisement from Wyoming DEQ, industry, and other interested parties, the extent and duration of any needed air resources monitoring will be determined.

Special requirements to mitigate air quality impacts and ensure compliance with state air quality standards will be included on a case-by-case basis in use authorizations. They may include restrictions on venting and flaring of natural gas and requirements for dust abatement measures.



# PROPOSED COORDINATED ACTIVITY PLAN AND ALTERNATIVES

## Transportation

### Objectives

All new roads on public lands will be designed to the BLM road standards (BLM Manual 9113) necessary to accommodate the intended functions.

Existing roads will be maintained to BLM standards, (drainage, safety, etc.). This objective will be accomplished in cooperation with the oil and gas industry, livestock operators, landowners, county and State agencies, and other users.

### Planned Actions and Requirements

BLM will complete an inventory of all existing roads in the area, and will establish a minimum road network necessary to support oil and gas operations as well as other uses. The BLM will continue to evaluate existing roads and will consider new road construction with the goal of minimizing road density in the area. The BLM will work with operators to identify roads that need to be upgraded to Bureau standards and excess roads to be closed and rehabilitated.

Roads that cross slopes greater than 15 percent will be identified and matched with the erosive soils data in the soils technical report (Map 5 and Appendix D) for the CAP area to determine which areas to inspect first (these areas have the highest potential for increased erosion). This will be an ongoing process which will be tied to field development.

New wells will be accessed using existing roads whenever possible. Where new access is needed, erosive soils, steep slopes, and mountain shrub communities will be avoided when practical to minimize erosion and the impacts on watersheds and wildlife habitat. In the next 10 years, lease and unit operators will close and reclaim approximately 110 miles of existing roads (see Map 2 for reclaimable roads and Appendix E for calculations). Reclamation of some of these roads started in 1989.

Existing roads (Map 2) will be reviewed by industry, BLM, and WGFD to identify opportunities for traffic management. Roads and trails in areas receiving heavy deer use will be prioritized for seasonal travel restrictions. This action will establish minimal human activity zones to help mitigate the impacts of winter vehicular traffic on big game. Selected roads will be closed to public access, as needed, to protect wintering, breeding, or nesting wildlife from harassment. Road closure will be accomplished with gates and signs stating, "Road Closed To Protect Wildlife."

Each new road proposal will have a comprehensive route analysis completed on it which will include consideration of whether:

- The road is necessary;
- There is a better route;
- Proposed road standards conform with BLM standards;
- Soils will be disturbed that require special attention (e.g., highly erodible, wet, steep slope, etc.);
- Additional engineering is required (e.g., slope greater than 15 percent or grade greater than 8 percent, or other special considerations such as bridges or drainage crossings, etc.).

Although in-place utility transmission facilities are currently meeting the need in the CAP area, demand for new facilities is expected. New pipeline, power, and other linear facility proposals will be evaluated using the criteria established in the *Standard Mitigation Practices Applied to Surface Disturbing Activities*, found in the Pinedale RMP, Appendix A-3. Existing utility corridors will be followed wherever they serve to best reduce environmental impacts, while meeting general industry objectives for the proposal. BLM will continue to evaluate existing utility corridors and determine where necessary maintenance and additional mitigation efforts are needed in order to ensure continued environmental integrity.

## Surface Disturbance

### Objectives

Protect certain sensitive resources and areas from the adverse affects of surface-disturbing activities and disruptive human presence. Sensitive resources and areas to be protected include:

- Streams from increased sedimentation and water quality degradation;
- Wildlife from disruption during mating, nesting, calving, fawning, or wintering;
- Threatened/endangered species and their habitat, and crucial wildlife habitat from disturbance or destruction;
- Wetland/riparian habitat from degradation and loss;
- Recreation sites and developments from disruption or removal;
- Historic trails from destruction and adverse visual impacts;



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- Watersheds from removal of soil material and vegetation cover causing increased erosion;
- Cultural sites from destruction.

### Planned Actions and Requirements

All surface-disturbing activities would include appropriate application of the *Guidelines For Surface Disturbing Activities* (Appendix A). Proposed construction (e.g., road, well pad, range improvements, pipeline, power line, etc.), affecting the following sensitive resources or areas will require consideration of other reasonable alternatives which will avoid the identified resource value or area.

- Steep slopes or erodible soils (Maps 4 and 5).
- Control watershed area (Map 11).
- Important wildlife habitat such as mountain shrubs (Map 6).
- Streams, ponds, wetlands, or riparian areas (Map 6).
- Crucial wildlife habitat (Maps 7 and 8).
- Class II VRM areas (Map 11).
- Historic trails (Map 11).
- Intermittent/ephemeral drainages.
- Recreation sites and developments.
- Cultural sites.

In some cases, directional drilling or other surface location mitigation will be considered as an option to site occupancy during the permitting process for surface use authorizations. Surface disturbance of sensitive resources or areas may be allowed by the Authorized Officer provided that detailed plans (e.g., engineering design, geotechnical analysis, habitat mitigation, etc.) are submitted by the applicant, and an adequate environmental analysis of potential impacts confirms that the disturbance can occur without unacceptable adverse impacts.

All activities would be restricted in areas with the following conditions to provide environmental protection of certain resource values.

- Slopes in excess of 25 percent.
- Within 500 feet (152 meters) of surface water and/or riparian areas.
- Within one-quarter mile or the visual horizon (whichever is closer) of historic trails.
- Construction with frozen material or during periods when the soil material is saturated or when watershed damage is likely to occur.

When one or more of these conditions exists, surface-disturbing activities will be restricted or prohibited by BLM, unless a mutually acceptable

mitigation plan is developed. Negotiations for surface disturbance of these sensitive areas will include detailed plans (e.g., engineering design, geotechnical analysis, habitat mitigation, etc.) submitted by the applicant, demonstrating that disturbance can be accomplished without unacceptable adverse environmental impact.

Where streams or wet areas cannot be avoided, the banks will be stabilized to limit erosion during the clearing operation. Construction techniques will minimize damage to stream banks and channels. Channel stabilization evaluations will be completed during on-site inspections.

If construction through wetlands or streams is necessary, construction will be scheduled to occur during the driest period possible to minimize damage and to coincide with the clearing operations. If sensitive riparian vegetation is identified, site specific construction, stabilization, and reclamation criteria will be submitted to and approved by BLM prior to issuing the authorization.

It shall be the responsibility of the applicant to comply with the construction practices and mitigating measures established by 33 CFR 323.4 which set forth the parameters of the "nationwide permit" required by Section 404 of the Federal Water Pollution Control Act. If the proposed action exceeds the parameters of the nationwide permit, the applicant shall obtain an "individual permit" from the appropriate office of the Corps of Engineers and provide BLM a copy of that permit prior to commencing actual construction. Failure to comply with this requirement shall be cause for revocation of an authorization.

All removal and storage of spoil material will be according to approved engineering designs. Care will be taken to avoid mixing spoil and topsoil. Erosion will be controlled on topsoil stockpiles through appropriate construction design and with seeding and/or mulching if necessary.

### Visual Resources

#### Objectives

Maintain overall integrity of visual resources while allowing for modification and changes to occur to meet other resource objectives.

#### Planned Actions and Requirements

A program will be initiated to improve the visual quality of oil fields in the CAP area by working with the companies to paint existing facilities to blend with the natural terrain.



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Projects of all types will generally be required to conform with the objectives and characteristics of the VRM classification for the areas involved, or the project will be modified in order to meet the VRM class objective.

Projects of all types will generally be required to conform with the objectives and characteristics of the VRM classifications, or the project will be modified to meet the objective (Map 11). In all cases, projects will be evaluated for their site specific and overall impact to the visual quality of an area. Mitigation measures will be developed to reduce or eliminate those impacts.

## Off-Road Vehicle Use

### Objectives

Allow the use of ORVs where compatible; provide adequate protection to identified sensitive resources.

### Planned Actions and Requirements

Public lands are designated as either "open," "closed," or "limited" to off-road vehicle (ORV) uses. None of the CAP area is closed year-round to ORV use.

The deer and antelope winter ranges in the CAP area have a winter travel limitation restricting vehicle travel from November 15 through April 30 on an **as-needed basis**. These seasonal limitations will be implemented in consultation with the WGFD during severe winter, high stress periods when disturbance of the wintering wildlife can have serious consequences.

Vehicle use will be monitored periodically to determine actual use and public demands. Monitoring will be conducted to determine needs for specific road closures and/or rehabilitation.

## Recreation

### Objectives

Manage recreation to accommodate existing uses and to prevent or mitigate environmental impacts.

### Planned Actions and Requirements

Public lands within the CAP will be managed to provide public recreational opportunities.

## Cultural Resources, Natural History, and Paleontology

### Objectives

Manage cultural and paleontological resources to resolve conflicts with other resource uses; provide appropriate levels of protection for significant cultural resources; provide for the scientific and educational use of cultural and paleontological resources.

### Planned Actions and Requirements

The cultural resource management process described in Appendix C will be followed. The Oregon/Mormon Pioneer National Historic Trails Management Plan will be followed for any actions affecting the Lander Road. Paleontological and historical sites will be protected through the use of surface and subsurface protection stipulations and discretionary management authority.

Uses of the public lands will be managed to avoid damage to cultural resources, minimize conflicts between uses of cultural resources and other uses of the public lands, provide for appropriate mitigation of unavoidable adverse effects on cultural resources prior to their disturbance, and identify and protect cultural resources.

## Lands and Realty

### Objectives

Provide land use authorizations in support of public needs; authorize occupancy or acquisition of public lands under appropriate realty actions within the objectives and guidance provided under all resources. This objective includes use of exchanges as the primary method of land disposal or acquisition to benefit other resource programs.

### Planned Actions and Requirements

Proposals for the disposal of public land will be considered on a case-by-case basis. The preferred method of disposal or acquisition of public lands by BLM is through exchanges. Appendix I lists lands identified as suitable for consideration for disposal, exchange, and acquisition for community and industrial expansion.

Prior to taking any disposal action, an environmental analysis will be conducted on the proposal and the involved lands will be evaluated for compliance



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with the disposal criteria in Appendix I and for consistency with the objectives of the RMP.

### Forestry

#### Objectives

Enhance forest stand biological diversity and productivity by reducing stand mortality and increasing stand rejuvenation/regeneration.

#### Planned Actions and Requirements

A timber sale is proposed to selectively harvest 70 acres of the 316-acre multi-aged Douglas-fir stand on the west side of Hogsback Ridge. The stand is sustaining mortality from Douglas-fir beetle and rust infestations. About 22% of the total stand will be harvested by removing individual trees that are infested, susceptible to infestation, and dead. A residual stocking of Douglas-fir will remain in the harvested area. Natural seeding is expected to occur, and seedlings will occupy the area within 15 years.

No new roads or road construction are required for the sale.

### Fire Management

#### Objectives

Fire management within the CAP area is described in the fire management plan for the Rock Springs District. Fire will be managed to protect public safety, life, and property while providing the maximum benefits of both prescribed fire and wildfire to overall resource management. Smoke from prescribed fire will be managed to avoid violations of air quality standards. All burns will be coordinated with the users and operators in the area.

#### Planned Actions and Requirements

Fire is a management option for manipulating vegetation.

Prescribed fire for vegetation manipulation will require an individual Prescribed Fire Management Plan where a prescribed set of conditions will be established for the given treatment area. Existing oil and gas operations; isolated residences; the communities of Big Piney, Marbleton, and LaBarge; as well as the satellite camps of Rainbow, Western, Calpet, and Dry Piney will require immediate safety consideration in times of wildfire. All prescribed burns will

be analyzed for the potential to violate air quality standards, and prescriptions modified to eliminate potential for standards violation.

### **ALTERNATIVE B - CAP Based on Amending the Pinedale RMP Decisions to Limit Restriction of Oil and Gas Exploration and Development Activities to a Maximum of 60 Days, to Limit Relocation a Maximum of 200 Meters, and to Allow No Provision for Off-Lease Siting of Operations.**

Alternative B would amend the decisions in the Pinedale RMP for oil and gas exploration and development restrictions based on the oil and gas industry's interpretation of the provisions of 43 CFR 3101.1-2 (i.e., "... at a minimum, reasonable measures shall be deemed consistent with lease rights granted provided that they do not: require relocation of proposed operations by more than 200 meters (656 feet); require that operations be located off the leasehold; or prohibit new surface disturbing operations for a period in excess of 60 days in any lease year"). This alternative results from industry interest in a strict interpretation of these regulations.

These restrictions are applied in situations where **oil and gas leases do not include stipulations or adequate stipulation provisions** that are later found to be necessary. For analysis purposes, these restrictions have also been applied to other activities not controlled by this regulation (i.e. geophysical operations, road closures, and mountain shrub protection), for consistency in the application of restrictions. Under this alternative, contrary to present BLM interpretation of 43 CFR 3101.1-2 and its current policy, these restrictions would be the maximum limits that BLM could impose at the time of permit authorization. Directional drilling could be considered as an option to relocation if BLM determined that surface resource values could not be protected by the 200-meter relocation limit. This would be achieved through consultation with industry representatives.

Under this alternative, it is assumed that 600 new wells would be drilled in the study area over the next 10 years. This anticipates that a majority of the area would be developed at 80-acre spacing during this



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period. To maintain consistency with the other alternatives, it is assumed that 100 wells would be drilled the first year. At some point during the 10-year period, it is anticipated that demand would push energy development to some higher level than the average. While this would not necessarily occur in the first year, it has been assumed as occurring in the first year in this scenario for analysis purposes. The remaining 500 wells would be drilled at the rate of about 55 per year over the next 9 years. Two hundred (200) wells would also be reclaimed during the 10-year period.

This alternative considers resource management and protection through the selection of management actions that resolve planning issues. However, it provides less restrictive seasonal and relocation measures on oil and gas development proposals. Multiple use management of the public lands and resources that best meets foreseeable oil and gas development needs is thereby maintained.

The elements of this alternative are detailed in the following description.

**Only those elements that differ from Alternative A are discussed.**

All other elements of this CAP are the same as Alternative A.

## RESOURCE MANAGEMENT OBJECTIVES, PLANNED ACTIONS, AND REQUIREMENTS

### Wildlife Habitat

#### Planned Actions and Requirements

##### Wildlife Habitat and Seasonal Protection

Crucial winter range, sage grouse breeding and nesting areas, and raptor nesting areas will be managed by imposing the 60-day seasonal constraint on development activities within these areas.

No new surface disturbing operations would be allowed for during one 60 day period between November 15 and July 31, within big game winter range (Maps 7 and 8) and raptor and/or sage grouse nesting habitat. This measure will partially protect wintering big game, and nesting sage grouse and raptors from disruption during crucial winter conditions.

The restricted 60-day period would be applied during the severe winter or when disturbance of wildlife in these areas would be critical. Exceptions to this constraint in any year may be approved in writing by the Authorized Officer.

Areas identified as crucial wildlife habitat or containing wildlife values (areas which cannot be protected with seasonal restrictions, e.g., a sage grouse lek or a raptor nest) would be avoided by relocating the proposed operations to a site causing the least impact within 200 meters (656 feet) of the crucial wildlife habitat or value.

Parts of the CAP area would be subject to a winter travel limitation, not to exceed 60 days (between November 15 and April 30), to protect wintering wildlife on an as-needed basis.

#### Mountain Shrub Protection

Important mountain shrub communities (3,937 acres) will be protected and maintained by avoiding them (to the extent feasible within 200 meters of the proposed operations) for road, well pad, and pipeline construction (see Map 6 for the location of mountain shrub communities).

### Transportation

#### Planned Actions and Requirements

New wells would be accessed using existing roads where possible. Where new access is needed, erosive soils, steep slopes, and mountain shrub communities would be avoided by relocating existing access roads to a site or area, within 200 meters that will minimize impacts.

Selected roads would be closed for up to 60 days to public access, as needed, to protect wintering, breeding, or nesting wildlife from disruption. Road closure will be accomplished with gates and signs stating, "Road Closed To Protect Wildlife."

### Surface Disturbance

#### Planned Actions and Requirements

Proposed construction (e.g., road, well pad, pipeline, power line, etc.), affecting the same sensitive resources or areas, listed in Alternative A, will require consideration of other reasonable alternatives which will avoid (to the extent feasible within 200 meters of the proposed operations) the identified sensitive resource value or area.



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Within 200 meters or the visual horizon (whichever is closer) of historic trails, there will be no surface disturbance.

## Off-Road Vehicle Use

### Planned Actions and Requirements

Same as Alternative A except dates change to one 60 day period between November 15 and April 30.

## ALTERNATIVE C - CAP Based on Amended Pinedale RMP Decisions that Shorten Seasonal Wildlife Restrictions and Reduce the Area of Use of Seasonal Restrictions in Crucial Winter Ranges.

Alternative C would amend the decisions in the Pinedale RMP as follows: seasonal restrictions for wintering mule deer and antelope would be reduced by 45 days (December 15 - April 15), and for breeding and nesting sage grouse would be reduced by 75 days (March 15 - June 30), with provisions for extension; seasonal stipulations (COAs) for crucial mule deer and antelope winter range will be applied to the entire area of designated crucial winter range on public lands except heavily used highway corridors, the base camps established in the area for industry use, and private and State owned lands. It would provide for protection of big game, sage grouse, and raptors and their habitat through consultation with industry, WGFD, and other interested parties if a longer seasonally restrictive period were needed.

Under this alternative, it is assumed that 600 new wells would be drilled in the study area over the next 10 years. This anticipates that a majority of the area would be developed at 80-acre spacing over the next 10 years. To maintain consistency with the other alternatives, it is also assumed that 100 wells would be drilled the first year. The remaining 500 wells would be drilled at the rate of about 55 per year over the remaining 9 years. Two hundred (200) wells would also be reclaimed during the 10-year period.

This alternative provides for oil and gas development while still maintaining other resource development and protection. This alternative supports management actions that enhance oil and gas devel-

opment opportunities based on marketing and industry priorities. It provides for multiple use management, coordination with interested parties, and oil and gas development of the public lands.

The elements of this alternative are detailed in the following description.

**Only those elements that differ from Alternative A are discussed.**

All other elements are the same as Alternative A.

## RESOURCE MANAGEMENT OBJECTIVES, PLANNED ACTIONS, AND REQUIREMENTS

### Minerals - Oil and Gas

#### Planned Actions and Requirements

Same as Alternative A except geophysical exploration, seasonal period of restriction, will be reduced.

### Wildlife Habitat

#### Planned Actions and Requirements

##### Wildlife Habitat and Seasonal Protection

No activities or surface use would be allowed from December 15 to April 15 within mule deer and antelope winter range (Map 12) to protect crucial winter habitat and to protect wintering animals from harassment. Exceptions to this constraint in any year may be approved in writing by the Authorized Officer (Appendix G).

No activities or new surface disturbances would be allowed from March 15 to June 30 within certain areas (Map 12) to protect important sage grouse nesting habitat, or from February 1 to July 31 to protect important raptor nesting habitat. The same restriction may apply to raptor and sage grouse winter concentration areas from December 15 to April 15. Exceptions to this limitation in any year may be approved in writing by the Authorized Officer.

If habitat or weather conditions, coupled with big game or sage grouse concentrations, dictate need of a longer protection period, consideration of an extension of the restriction would be negotiated with



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industry. This would entail a review of the following information in conjunction with the abiotic and biotic evaluation factors listed in Table G-1 of Appendix G:

- Type of operation and associated disturbance factors (noise, traffic, equipment, and length of time required).
- Wildlife density, distribution, and condition.
- Habitat condition (forage availability).
- Location of the project (relating to possible wildlife habituation to the activity).
- Current climatic factors (temperature and snow).
- Weather forecast for the duration of the project.
- Time of year (i.e., early, mid, or late winter).
- Opportunity for mitigation.

The condition under which an extension may be imposed would be based on whether the new proposed activity may have a direct adverse impact on the reproduction capability and survival of individual big game, sage grouse, or raptors.

For proposed activity within a raptor nesting area, as an option to the seasonal restriction, the following measures would be considered to protect raptor nests:

- Delay commencement of proximate construction and operations until young birds have fledged.
- Move raptor nest out of path of construction after chicks are old enough to tolerate the disturbance.
- Remove and relocate raptor chicks from their original nest to a foster nest.
- Where raptors are known to have multiple nest sites within their nesting territory, place a wire cage over an existing nest in impact zone of construction to deter nesting before adult birds arrive in the spring.
- Where raptors are known to have suitable alternative nest sites or habitat within the area, obtain Federal and State permits to eliminate or move nests in path of construction during period of nonuse.

Parts of the CAP area would be subject to a winter travel limitation (December 15 to April 15) to protect wintering mule deer and antelope on an as needed basis.

## Off-Road Vehicle Use

### Planned Actions and Requirements

Same as Alternative A except dates change to December 15 through April 15.

## ALTERNATIVE D - CAP Based on Amended Pinedale RMP Decisions that Apply No Seasonal Restriction on Oil and Gas Exploration and Development Activities in Mule Deer, Antelope, Sage Grouse and Raptor Crucial Habitat.

Alternative D, which was developed by the Rocky Mountain Oil and Gas Association (RMOGA) and provided to BLM, would amend the RMP decisions as follows: eliminate winter seasonal restrictions on well drilling and completion projects in deer and antelope crucial winter range; impose a time-of-day limitation on activity in sage grouse habitat, in-lieu of surface use limitations; establish a maximum ¼ mile radius surface use restriction area around sage grouse leks where necessary due to actual nesting activity; impose reasonable mitigation requirements which allow surface occupancy within 500 feet of water; and provide for road closures only after consultation and concurrence of the oil and gas operators.

**Note:** BLM added consideration of antelope to the RMOGA proposal because of the overlap of the deer and antelope crucial winter ranges.

Under this alternative, BLM will analyze the impacts of 900 wells being drilled in the study area in the next 10 years. This level of activity would represent a 20% increase in the number of wells drilled during this area's busiest decade (753 from 1956-1965). While this level of activity is not anticipated, it is possible. The BLM, therefore, feels it is necessary to analyze this level as the upper extreme of activity. Consistent with the other alternatives, BLM will analyze 150 wells being drilled in the first year with the remaining 750 wells being drilled at the rate of 83 wells per year. Two hundred (200) wells would also be plugged and reclaimed over those 10 years.



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This alternative emphasizes oil and gas development, and provides for some wildlife resource protection. This alternative proposes management actions which will enhance oil and gas development opportunities based on marketing and industry priorities.

The elements of this alternative are detailed in the following description.

**Only those elements that differ from Alternative A are discussed.**

All other elements are the same as explained in Alternative A.

## RESOURCE MANAGEMENT OBJECTIVES, PLANNED ACTIONS, AND REQUIREMENTS

### Minerals - Oil and Gas

#### Planned Actions and Requirements

Development would be allowed to continue to the extent necessary to efficiently develop the oil and gas resources underlying the CAP area (i.e., up to 900 wells over the next 10 years).

Geophysical notices of intent would be evaluated on a case-by-case basis. Appropriate limitations would be applied, including vehicle use restrictions, seasonal limitations, and explosive charge limitations. However, deer or antelope winter range within the CAP area would not be subject to winter restrictions.

### Wildlife Habitat

#### Planned Actions and Requirements

##### Wildlife Habitat and Seasonal Protection

Crucial elk and moose winter range, and sage grouse breeding and nesting areas would be protected and maintained by imposing seasonal constraints as a condition of approval on permits for development activities within these areas. Winter restrictions on drilling and completion projects would be eliminated within mule deer and antelope winter range (Maps 7 and 8).

No activities or surface use would be allowed within a maximum of ¼ mile radius around sage

grouse leks (Map 8) where necessary due to actual nesting activity to protect important sage grouse nesting habitat. A time-of-day limitation would be imposed in-lieu of surface use limitations where feasible on facility maintenance activities. An inventory to identify suitable sage grouse habitat would be completed.

**Note:** Because the RMOGA alternative was based primarily on the Hayden-Wing report, (*Review and Evaluation of the Regulations and Effects of Oil and Gas Development on Mule Deer, Sage Grouse, and Raptors*, 7/5/90), the BLM added the recommendations related to raptors to make sure they were covered in the alternative.

For proposed activity within raptor nesting areas, as an option to the seasonal restriction, the following measures would be considered to protect raptor nests:

- Delay commencement of proximate construction and operations until young birds have hatched.
- Move raptor nest out of path of construction after chicks are old enough to tolerate the disturbance.
- Remove and relocate raptor chicks from their original nest to a foster nest.
- Where raptors are known to have multiple nest sites within their nesting territory, place a wire cage over an existing nest in impact zone of construction to deter nesting before adult birds arrive in the spring.
- Where raptors are known to have suitable alternative nest sites or habitat within the area, obtain Federal and State permits to eliminate or move nests in path of construction during period of nonuse.

A cooperative plan will be developed among the BLM, Wyoming Game and Fish Department, and oil and gas industry within two years of completion of the CAP documents to identify and design opportunities for mitigating energy development impacts to wildlife habitat. The cooperative plan would include habitat improvement considerations as follows:

- WGFD wildlife habitat improvement project and funding over the next 5 years.
- BLM programming/budgeting and cost sharing with WGFD in habitat improvement projects in the CAP area.
- Vegetative treatment projects in terms of location, goals, and cost.
- WGFD population objectives for mule deer in the CAP area, including management techniques to be employed to control herd size and maintain and/or improve habitat.



## **Transportation**

### **Planned Actions and Requirements**

Selected roads would be closed to all usage, as needed, after consultation and concurrence with the operators to protect wintering, breeding, or nesting wildlife from disruption. Road closure would be accomplished with gates and signs stating, "Road Closed To Protect Wildlife."

## **Surface Disturbance**

### **Planned Actions and Requirements**

Restriction of 500 feet from surface water and riparian areas has been deleted. Adequate safeguards to maintain water quality and to reduce salinity contamination exist which eliminate the need for a 500-foot surface occupancy restriction.

## **Off-Road Vehicle Use**

### **Planned Actions and Requirements**

ORV travel limitations in the CAP area in mule deer and antelope winter ranges will be imposed only on recreation activities.

## **ALTERNATIVE E - CAP Based on Amended Pinedale RMP Decisions to Provide for Maximum Level of Oil and Gas Development.**

This alternative amends the RMP decisions as follows: increases the level or rate at which oil or gas development would occur to 900 wells which may be drilled in the next 10 years; and relies solely on the oil and gas industry to voluntarily provide consideration for wildlife and wildlife habitat protection needs in their oil and gas operations.

This alternative will provide for no conditions of approval (COAs) for seasonal restrictions to protect wintering, breeding, or nesting wildlife; allows for no relocation requirements to protect mountain shrub communities or other biologically sensitive resource values or areas (e.g., streams, fawning areas, wetland/riparian habitat); provides no restriction to

protect wildlife habitat or values (e.g., sage grouse lek, raptor nest); nor any road closure considerations to protect winter habitat or wintering wildlife from harassment.

Under this alternative BLM assumes that 900 new wells would be drilled in the study area over the next 10 years. This is based upon industries' request to reduce the restrictions on oil/gas production to allow full development of the resource. There are 1,080 wells now operating in the area. Although this level occurred over the past 65 years, BLM has accepted for analysis purposes that a similar level of development might be possible over the next 10 years. BLM also assumed, in order to maintain consistency with the other alternatives, that 150 wells would be drilled in the first year. The remaining 750 wells would be drilled over the next 9 years, at the rate of about 83 per year. Two hundred (200) wells would also be reclaimed over those 10 years.

This alternative emphasizes oil and gas infield development with a substantially reduced level of BLM intervention into the protection and management of public land biological resources, particularly wildlife and wildlife habitat. This alternative selects management actions that enhance oil and gas development opportunities, based on marketing and industry priorities, over the protection and development opportunities of other public land resources. It provides for multiple use management, but emphasizes oil and gas development of the public lands and voluntary implementation of protective measures.

The elements of this alternative are detailed in the following description.

**Only those elements that differ from Alternative A are discussed.**

All other elements are the same as Alternative A.

## **RESOURCE MANAGEMENT OBJECTIVES, PLANNED ACTIONS, AND REQUIREMENTS**

### **Minerals - Oil and Gas**

#### **Planned Actions and Requirements**

Oil and gas development will be allowed to occur at a level (e.g. 900 wells) necessary to fully develop the resource. Development of reserves underlying the Big Piney-LaBarge field will continue over the next 10 years.



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## Wildlife Habitat

### Planned Actions and Seasonal Protection

#### Wildlife Habitat and Seasonal Protection

Protection for and maintenance of crucial winter range, sage grouse breeding and nesting areas, and raptor nesting areas would be limited to the oil and gas operators using self-imposed constraints.

#### Mountain Shrub Protection

The oil and gas operator would protect and maintain mountain shrub communities by avoiding these areas as much as reasonably possible for road, well pad, and pipeline construction (see Map 6 for the location of mountain shrub communities).

#### Aquatic Management

Protection and maintenance of highly important wetland/riparian zones by avoiding these areas would be at the discretion of the oil and gas operator in coordination with the BLM and WGFD. (See Map 6 for the location of wetland/riparian areas).

With no wildlife restrictions, it would be at the discretion of the oil and gas operator whether oil and gas development activities or surface use will be curtailed during any winter periods or during breeding/resting periods for sage grouse or concentration periods for raptors.

The oil and gas operator would determine whether winter travel for oil and gas development will be curtailed November 15 to April 30 to protect wintering wildlife on an as-needed basis.

## Transportation

### Planned Actions and Requirements

New wells will be reached using existing roads where possible. Where new access is needed, erosive soils and steep slopes will be avoided to minimize erosion impacts.

## Surface Disturbance

### Planned Actions and Requirements

The oil and gas operator, for any proposed construction (e.g., road, well pad, pipeline, power line,

etc.) affecting identified sensitive resources or areas, as well as future areas identified, would give consideration to other reasonable alternatives which will avoid the sensitive resource value or area. Directional drilling or other surface location mitigation will be analyzed as reasonable alternatives during the permitting process for surface use authorizations: (Same sensitive resources or areas as Alternative A.)

## Off-Road Vehicle Use

### Planned Actions and Requirements

For recreational uses, this alternative is the same as Alternative A. For oil and gas activity, no consideration will be given to closing roads for wildlife.

## ALTERNATIVE F - CAP Based on Amended Pinedale RMP Decisions to Further Enhance Surface Resource Protection.

Alternative F, which was developed by the National Wildlife Federation, the Wyoming Wildlife Federation, and the Wyoming Chapter of the Sierra Club, and provided to BLM, amends the RMP decisions with the following provisions: reduces the level of oil and gas leasing and development, reduces road access, provides for more intensified management of livestock use in the study area, increases protection of mountain shrub communities, promotes more intense habitat management efforts, recommends an increased level of resource management involvement and cooperation between BLM and other interest groups, directs forest management at enhancement of other resources, provides for land tenure adjustments to improve management of the riparian areas and recreation opportunities, and urges adoption of the State of Wyoming best management practices for watershed protection.

This alternative emphasizes the environmental protection of the naturally occurring surface resources (e.g. wildlife, watershed) while still maintaining some level of commodity development and production. This alternative enhances environmental values.

Under this alternative, BLM assumes, for analysis purposes only, that 200 new wells would be drilled in the study area over the next 10 years. The two hundred (200) well level is based on a basic premise that development would only be allowed to occur at



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the same rate as reclamation, on an acre for acre basis. Since it is expected that 200 wells could be reclaimed in that 10-year period, 200 wells could be developed. The planned reclamation of roads will return approximately 210 acres to vegetative production (see Appendix E). This could possibly allow for the drilling of approximately 70 additional wells. Since the wells to be reclaimed have not been specifically identified and may return less than 3 acres per well to vegetative production, BLM will be conservative and analyze the drilling of only 200 wells. The rate of development analyzed is 20 wells per year.

Considering the number of roads that have been identified for reclamation in the CAP area, it is possible that more acreage could be reclaimed than is analyzed and, therefore, an increase in the number of wells allowed to be developed could occur.

The elements of this alternative are detailed in the following description.

**Only those elements that differ from Alternative A are discussed.**

All other elements are the same as explained in Alternative A.

## RESOURCE MANAGEMENT OBJECTIVES, PLANNED ACTIONS, AND REQUIREMENTS

### Minerals - Oil and Gas

#### Planned Actions and Requirements

Development will be allowed to continue at a reduced level to develop the oil and gas resources underlying the plan area (i.e., up to 200 wells over the next 10 years). Operators, over the next 10 years, will complete abandonment procedures (plug and reclaim) on approximately 200 wells that have no potential for future use. The wells will be plugged in accordance with BLM approved procedures to protect freshwater aquifers. The oil and gas industry would reclaim acreage equal to new development. BLM would be required to monitor the level of reclamation success, in order to justify new well approvals.

These well locations, along with their associated access roads, pipelines, and power lines will be recontoured to natural shape and seeded to serve as wildlife and livestock grazing habitat. See Map 2 for the location of existing wells and roads.

Geophysical notices of intent will be evaluated on a case-by-case basis. Appropriate limitations will be applied, including vehicle use restrictions, seasonal limitations, and explosive charge limitations.

Generally, all authorizations will be issued with appropriate application of surface disturbance mitigation requirements as presented in Appendix A.

A volunteer reclamation plan could be designed by all affected parties, BLM and WGFD, to allow for more energy development, based upon an acre for acre premise, and confirmed through monitoring reclamation success. The cooperative plan will include improvement considerations as follows:

- WGFD wildlife habitat improvement considerations and funding over the next 5 years.
- BLM programming/budgeting and cost sharing with WGFD in habitat improvement projects in the CAP area.
- Vegetative treatment projects in terms of location, goals, and cost.
- WGFD population objectives for big game and game birds in the CAP area, including management techniques to be employed to control herd/flock size and maintain or improve habitat.

### Wildlife Habitat

#### Planned Actions and Requirements

##### Mitigation of Habitat Degradation

To avoid blocking wildlife migration, electrical and/or suspension fences will be used in the Big Mesa pasture to divide it into more pastures.

BLM will accelerate the completion and implementation of AMPs in Improve "I" category allotments. BLM will monitor the success of the implementation of the AMPs and livestock activities in the CAP area for compliance with range management objectives stated in the RMP.

On crucial big game winter and transitional ranges, a concentrated effort for habitat improvement will be undertaken by using various vegetation treatments techniques such as seeding, brush beating, harrowing, pitting, and prescribed burning.

BLM will aggressively implement the East Front Aquatic Habitat Management Plan to further intensive management of the Colorado River cutthroat trout. In areas where streams are capable of cutthroat trout protection, BLM will take such actions as:



# PROPOSED COORDINATED ACTIVITY PLAN AND ALTERNATIVES

- Identifying segments of streams to WGFD that may need in-stream flows to insure suitable habitat;
- prohibition of surface disturbing activities within a stream side buffer strip; and
- control of livestock grazing in and near streams to protect the trout habitat and riparian areas.

Forest management in the CAP area will emphasize techniques compatible with the protection or management of other resources, rather than upon production of forest products.

Consideration will be given to retention of and obtaining legal access to 440 acres of public surface surrounding the Sixty-Seven Reservoir in an effort to improve management of the riparian habitat and enhance recreation opportunities.

To protect watershed quality from the effects of erosion, the BLM will follow the best management practice guidelines for watersheds adopted by the State of Wyoming.

Protection will be provided to mountain shrub communities by not allowing surface occupancy, or by prohibiting land use authorizations (Maps 7 and 8).

## Livestock Grazing Management

### Planned Actions and Requirements

Consultation would be conducted before constructing any new fences in crucial big game winter ranges, (similar to Alternative A). Until range utilization studies are completed in the CAP area, BLM should limit livestock utilization to 40% on upland vegetation areas and 30% on riparian areas that are less than excellent condition, with 40% the maximum utilization limit on healthy riparian areas.

## Transportation

### Planned Actions and Requirements

Reduce road density in the CAP area to the minimum necessary for service of authorized activities. Reclaim those roads which are deemed unnecessary for authorized use. Limits should be placed on lease holders' use of roads in the winter for oil and gas operations and maintenance activities (i.e. frequency of visits, etc.) for the protection of crucial big game ranges.

To protect big game habitat and reduce displacement of herds, roads in crucial winter habitat areas

should be closed to recreational ORV vehicles from November 15 through April 30, rather than on the "as-needed basis" cited in the CAP. In areas of crucial big game winter and transitional range, use of ORVs will be prohibited from all off-road activity throughout the year (closed to ORV use).

## Surface Disturbance

### Planned Actions and Requirements

No new wells would be developed above the 200-well level equal to the number of reclaimed sites unless the number of reclaimed sites was increased. Within crucial big game wintering transitional range, there either would be no new leasing of Federal lands for oil and gas operations, or a No Surface Occupancy (NSO) stipulation would be placed on all new oil and gas leases. Existing well pads would be used where directional drilling of new wells could be accommodated to protect crucial winter ranges for big game.

## Forestry

### Planned Action

This is the same as Alternative A. The proposed 70 acre timber sale is designed to improve the health of the forest, rather than as a timber products sale. It is designed to be a selective harvest from a multi-aged Douglas-fir stand since the stand is currently sustaining mortality from a Douglas fir beetle infestation. About 22% of the total stand will be individual tree harvested, removing susceptible, infested, and recent mortality trees in order to protect the remaining forest area. Natural seeding is expected to occur, and seedlings will occupy the area within 15 years.

## ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

### 1. Intensify Grazing Management Using Rest Rotation System

An alternative to the "deferred rotation grazing system" (i.e., delayed pasture grazing until new plants become established, existing plants restore depleted spring food supplies and seeds mature) proposed for the North LaBarge Common and Calpet Common Allotments is the "rest rotation grazing



## PROPOSED COORDINATED ACTIVITY PLAN AND ALTERNATIVES

system" (i.e., pasture grazing in which rest of one pasture each year occurs to allow new plants to become established, existing plants to restore depleted spring food supplies and seeds to mature).

Further consideration of the rest rotation grazing system, as the system that should be used to intensify grazing management, would be unreasonable and unwarranted because it is this grazing system that has been in effect for the North LaBarge Common Allotment (which has included the proposed new Calpet Common Allotment). This system was designed and implemented in 1972, but it has not been successful. Two factors were principally responsible for the unsuccessful results:

**Topographic Variations** - particularly in the Cretaceous, Pine Grove, and Trail Ridge pastures designed for summer use, which are high elevation pastures making up approximately one-third of the allotment, and

**Range Readiness** - the scheduled rotation from pasture to pasture was unworkable because some pastures were not range ready when needed, putting greater pressure on other pastures.

The proposed "deferred rotation grazing system" has taken these limitations into consideration and it will reduce any extended use periods on any one particular pasture.

## 2. Intensify Grazing Management Using Range Riders

One method of managing livestock distribution is herding with range riders. This method is seldom used as the sole means of managing cattle distribution because of the difficulty in retaining knowledgeable, dependable worker(s) willing to work under adverse environmental conditions for low wages.

Nevertheless, herding livestock with riders will be a necessary part of implementation of the proposed deferred rotation grazing system. Riding to obtain maximum distribution of livestock will be a key to the success of the proposed grazing system.

It would be unreasonable to consider using range riders as the sole means of grazing management in the North LaBarge Common and Calpet Common Allotments because the majority (approximately 95 percent) of the pasture fences are in place.

Overall, only approximately 6 miles of fence in the North LaBarge and Calpet Common Allotments in 5 separate segments, are proposed to implement the grazing system. The new fencing will be three-strand barb-wire designed to accommodate wildlife movements.







# CHAPTER III

## AFFECTED ENVIRONMENT

### INTRODUCTION

The Pinedale RMP (Chapter 3) provides a broad description of the existing environment for the Pinedale Resource Area. The following provides a narrower, more detailed description of the present situation for the Big Piney-LaBarge CAP area.

### LAND AND MINERAL OWNERSHIP IN THE CAP AREA

The CAP area is a mosaic of Federal surface and minerals, State surface and minerals, and private surface and mineral ownership. As the following table indicates, the majority of the acreage in the CAP area is in Federal ownership (78%), when both surface and mineral ownership is considered.

### CLIMATE

Elevations (above sea level) within the CAP area range from 6,500-9,000 feet. This range can be subdivided into three main zones. These are the areas between 6,500-6,600 feet along the Green River; the areas between 6,600-7,000 feet in the low-land areas of Dry Basin, west LaBarge, and Calpet; and the areas between 7,000-9,000 feet which include Hogback Ridge, Big Mesa, Little Mesa, Deer Hill, and Creaceous Mountain.

Frequent low pressure systems, originating in Canada, move southeasterly over the area causing strong, gusty winds but little precipitation. Maximum precipitation is in the late spring. During the summer, showers and thunderstorms are frequent but generally light. Occasionally, heavy rains associated with thunderstorms occur.

Because of its 6,500-9,000 foot elevation, the climate is relatively cool, but with large seasonal temperature changes. Summer nights are often cool,

OWNERSHIP	ACRES	PERCENT
<b>Surface Ownership:</b>		
Federal Surface	= 135,785	69%
Private Surface	= 50,520	26%
State Lands	= 10,536	5%
<b>TOTAL CAP AREA</b>	<b>= 196,841</b>	<b>100%</b>
<b>Mineral Ownership:</b>		
Federal Minerals	= 154,471	78%
Private Minerals	= 30,075	15%
State Minerals	= 12,295	7%
<b>TOTAL CAP AREA</b>	<b>= 196,841</b>	<b>100%</b>

even though daytime temperatures may reach 90° F. During the winter, cold fronts create rapid and frequent changes between warm and cold temperatures. Although temperatures are generally cooler in the mountains than the valleys, it is not unusual for the Green River Valley to be colder than the surrounding mountains. This results from the sheltering effect of the mountains and cold air drainage at night.

**Winds** - A summary of available surface wind speed and wind direction data for five sites shows that strong westerly winds are most frequent. All data demonstrates that the highest wind speeds are associated with westerly winds. Upper level morning winds are predominantly from the west through northwest, and change very little up to 4,300 feet above ground. The afternoon winds are typically more westerly at all altitudes. Average wind speeds



## AFFECTED ENVIRONMENT

range from 11-16 miles per hour near the surface to 20-25 miles per hour at 4,300 feet above ground. Prevailing wind speeds disperse area pollutants.

**Precipitation** - Precipitation is greatest in the late spring and early summer for the lower altitude sites. Total annual precipitation increases at higher elevations. Snowfall in the region varies considerably by location, and may be very different from one year to the next at the same site. Heavy snowstorms are often associated with strong, gusty winds which greatly reduce visibility and cause drifting of snow. The average annual precipitation recorded for the 37-year period of 1941-1977 at the Big Piney station (elevation 6,820) is 8.6 inches.

Drought and flooding occur within the area. Droughts were quite widespread throughout the State in 1952, 1954, 1956, 1966, and 1987 through 1989. Flooding typically occurs when heavy spring rains combine with accelerated snow melt. From 1948-1970, three damaging floods in the Pinedale area were recorded. These events, causing slight damage, occurred in the early and late spring.

**Temperature** - The Big Piney data show that average temperatures are below freezing from November through March. Mean monthly temperatures range from 25°F in January to 80°F in July, and mean monthly minimum values range from -5°F to 40°F. Average nighttime minimum temperatures are below freezing in all months except June, July, and August. The extreme cold winter temperatures in the area often cause the soil to freeze. This is an important consideration for gas pipeline placement, because the pipeline depth must be below freeze line to prevent damage. Local plumbers bury pipes 6-8 feet to prevent freezing. The temperature extremes in the CAP area range from -48°F to 97°F.

**Severe Weather** - Severe weather includes thunderstorms and blizzards. The peak thunderstorm season is July and August. Brief gusty winds and heavy rains generally accompany thunderstorms. Hail is common with well-developed thunderstorms.

Severe blizzards with associated snow drifts and high winds, causing road blockages and damage to power and communication lines, can occur several times per year. In most cases, the high winds cause more damage and disruption than does the amount of snowfall.

## SOCIOECONOMIC

**General** - The CAP area is in the immediate vicinity of the communities of Big Piney and Marbleton in Sublette County and LaBarge in northern Lincoln County. For purposes of this economic analysis, these communities and Sublette County are regarded as the area of local economic impacts. Lincoln County is not included, even though LaBarge is located there, because of the greater size of its economy and the much smaller impact that any CAP area activities would have on its economy compared with that of Sublette County. The latter is highly dependent on economic activities in the CAP area. Therefore, considering a Lincoln/Sublette coalition for impact analysis would lose sight of the importance of the CAP area impacts on Sublette County. Because activities in the CAP area involve economic transactions with other counties in the region (especially communities such as Rock Springs, Kemmerer, Evanston, and LaBarge), the total economic region considered in this analysis will cover Lincoln, Sublette, Sweetwater, and Uinta Counties.

**Note:** Data represented throughout the socioeconomic section is the most current available.

### The Four-County Area

**Income** - The four-county area accounted for about 16% of total personal income in Wyoming in 1987. Total personal income in the four-county area in 1987 amounted to slightly over \$1 billion, with average per capita that year at \$11,883. Sublette County with about \$71 million in total personal income, accounted for almost 7% of the four county total. Average annual per capita income in this county in 1987 was \$12,912.

Earned income (a sub-unit of total personal income) in the four-county area was approximately \$859 million in 1987, with over \$46 million (between 5% and 5.5%) realized by Sublette County. The economic sectors which provided the most earnings to the four-county area in 1987 were minerals (31%), Government (18%), transportation (13%), and construction and services (each 10%). The retail sector provided 7% while wholesale, manufacturing, financing, and agriculture each provided less than 5%.



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Sublette County's major sources of earned income in 1987 were minerals (25%-\$11.86 million), Government (23%-\$10.79 million), services (15%-\$7.22 million), construction (15%-\$6.92 million), transportation (9%-\$3.98 million), and retail (6%-about \$2.99 million). The agricultural, manufacturing, wholesale, and financial sectors each represented 2% or less of the county's earned income that year.

Wages and salaries in the four-county area in 1987 totaled \$716.5 million, 83% of the area's total earned income. Other labor income represented an additional 7% and proprietor's income 9%.

In Sublette County, wages and salaries totaled \$36.07 million, or 77% of the county's total earned income. In this county, proprietor's income accounted for 17% of the total and other labor 6%.

**Employment** - The two major sources of employment data consulted for this report are: the Wyoming Department of Administration and Fiscal Control (DAFC) and the Employment Security Commission of Wyoming (ESC). The DAFC data does not distinguish between full- and part-time positions when listing total people employed. By contrast, ESC data lists employment by person employed, regardless of the number of jobs that person holds. In effect, the DAFC data shows jobs worked while ESC data shows people working.

The DAFC data indicates that full- and part-time positions providing employment in the four-county area in 1987 totaled 40,063, down about 14% from the previous year and 15% from 1985. There were 2,862 positions in Sublette County that year, down over 26% from the previous year's level and 23% from 1985. The four-county area accounted for about 16% of the State's total full- and part-time positions in 1987. Sublette accounted for 1% of the State total that year.

According to the ESC reports, the labor force in the four-county area in 1988 totaled 36,349, while employment (persons working - not jobs worked) reached only 33,621, resulting in an unemployment rate of 8.3% (about 32% higher than the State average that year). The Sublette County labor force in 1988 was 2,682 with employment at 2,479, resulting in an unemployment rate for that county of 7.6%. The unemployment rate in Sublette was the lowest in the four-county area. The other three counties had rates over 8% and Lincoln County's rate was almost 9%.

It is estimated by DAFC that, in 1988, Sublette County provided 24% of the area positions in agriculture; 9% in the financial sector; 7% in Government, services, and retail sectors; 6% in the wholesale and minerals sectors, and 5% or less in all other sectors. Sweetwater County was the area's major

contributor to employment opportunities in 1988, providing an average of about 50% of the area's total positions.

The share of job opportunities in the four-county area provided by the major industrial sectors in 1988 were estimated to be as follows: Government (19%), service (16%), minerals (16%), retail (16%), transportation (10%), and construction (9%). In Sublette County, percentages for these sectors were Government (18%), agriculture (18%), services (16%), retail (15%), minerals (13%), and construction (7%). These estimates were made by DAFC in 1989. At that time, the number of total 1988 jobs provided by the major sectors in Sublette County were thought to be as follows: government-517, agriculture-514, services-468, retail-423, minerals-388, construction-192, and transportation-168.

**Population** - The Wyoming Data Handbook for 1989 reported that population for the four-county area totaled about 82,000 in 1987 and 1988, about 17% of the State total those years. Sublette County population in those years totaled almost 5,000.

**Property Valuation and Taxes** - Total gross valuation of property in the four-county area was over \$1.9 billion in 1988, with Sublette County accounting for over \$152 million.

Mineral production in the region in 1988 was valued at over \$1.1 billion, with almost \$68 million from Sublette County. The largest mineral production value in the region was recorded for Sweetwater County (\$553 million).

The total taxable value of property in the region in 1988 was almost \$1.7 billion. In Sublette County it was over \$136 million. Taxes on this property in the region totaled over \$134 million, reaching almost \$10 million in Sublette County.

Sales taxes paid in the region during Fiscal Year 1988 and 1989 totaled about \$26 million and \$25 million, respectively. Sublette County received between \$900,000 and \$1 million in each of these years.

Use taxes in the region in Fiscal Year 1988 totaled over \$6 million, with Sublette County receiving over \$355,000. In Fiscal Year 1989, the regional total increased to over \$7 million, but Sublette County's total dropped to around \$155,000.

### Local CAP Area - Affected Environment

**Overview** - Local communities in the CAP area are highly dependent upon the minerals sector (especially the oil/gas sector) for employment and income. Estimates place the area's dependency on



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the minerals sector at between 75% and 90%. Other sources of income and employment are Government, services, construction, wholesale and retail operations, and agriculture.

Economic impacts from tourism within the CAP area are minor, because tourists are normally passing through the area on their way to other destinations.

Because of the area's dependency on oil/gas operations, the economies of the local communities are extremely susceptible to trends (boom/bust cycles) common to minerals activity. The communities also experience yearly seasonal cycles related to the oil and gas drilling operations in the area.

### Oil and Gas Activities

**Housing** - At least 50% of rig workers are nonresidents who live in temporary housing in the local CAP area during the drilling season, and such housing is filled to capacity in the drilling season and largely empty during the off-season. Some drilling contractors report that they provide housing for their nonresident workers, but it is not known how many workers this involves. Therefore, this report assumes workers spend money in the local area to acquire housing. Less than 50% of the nonresident workers are reported to be married, and most of these do not bring families with them to the local area.

A large number (about 30%) of oil/gas service industry employees are also nonresidents living in temporary housing during the drilling season.

Some oil field camps are provided by various oil/gas companies for employees involved in the permanent day to day operations of the oil and gas fields.

These camps are composed of houses or trailers, garages, shops, warehouses, and offices. Western Oil Refining, Christmann Oil, Wexpro Oil, Texaco, and Chevron presently operate such permanent field camps. Local expenditures related to these camps are not affected by seasonal drilling operations in the area.

**Mobility and Employment** - Migrant oil/gas field workers often leave the area at the end of a drilling season with substantial unpaid debts and never return to the area. Instead, the next drilling season sees new rig workers from both inside and outside of Wyoming.

Many toolpushers and drillers are local residents with families. A number of local Big Piney/LaBarge area residents also provide services to oil/gas rigs. A number of workers on rigs and in the servicing

businesses live in Pinedale, Kemmerer, Evanston, and Rock Springs and commute to the CAP area during the drilling season. These workers may spend some time (a week or two) at local area housing during their shifts of work on the rigs to rest from the commuting routine.

The cyclical nature of the oil/gas and related minerals activities in the CAP area leaves local residents underemployed or unemployed in the off-season between November and May each year. Many of the unemployed collect compensation, however, businesses and proprietors suffering economic downturns during these periods are not normally eligible for such compensation.

Because of the tight labor market that exists for skilled rig and related labor, the emigrating migrant oil field workers are able to find other employment quickly. This seasonal situation makes it very difficult for employers to acquire skilled workers when the drilling season resumes the following year. This increases the training time for the new workers and the chances of accidents related to job activities, especially around the rigs. It also makes for unstable communities.

More workers would bring their families if they could stay in the local area year-round. Married migrant oil field workers have smaller families than the local married workers. The average size of families of married local workers appears to be 4 to 6 while that of migrant labor is 2 to 4.

Spending in the local area by migrant oil/gas employees is for necessities only. Although many local prices are higher than prices for the same products in larger communities, their salaries and work schedules encourage them to spend locally. This provides income to local businesses and taxes to the local communities which decline substantially during the off-season. However, it appears that drilling seasonality is more a product of market conditions and the severity of the weather than it is of any drilling regulations imposed by Federal, State, or local Governments.

According to Wyoming Labor Force Trends, (Vol. 27, No. 7, July 1990) percentages expended out of each dollar of income for various items are as follows: housing=22%, groceries=17%, transportation=13%, utilities=11%, health care=7%, and miscellaneous=30%.

It is estimated that rig workers who are local residents spend about 80% of their income in the local area compared to 50% for nonresidents.

**Drilling Activity** - In the past, when market conditions encouraged drilling, drilling and completion rigs operated year-round, despite the much higher economic costs of operating rigs and related ma-



## AFFECTED ENVIRONMENT

chinery in the severe winter months. At present, winter drilling is not preferred because of the high costs in clearing roads, running machinery, and keeping crews in the field in severe weather.

If there were no winter drilling restrictions, wells might be drilled in November, December, March, and April, weather permitting.

One scenario would be to drill wells at higher elevations in the summer months and at lower elevations in early winter and early spring months. Companies would like the option of being able to drill all season long if market conditions would warrant it.

**Rig Data** - Eight to 12 drilling rigs are normally operating in the CAP area during the drilling season, and about 8 rigs were operating during the 1989 season when 54 wells were drilled. There is usually one completion rig working in the area for each drilling rig.

Most of the wells being drilled in the area are gas. The relatively shallow, older oil fields in the CAP area are declining in productive potential. The remaining oil reserves are much deeper and more expensive to develop.

The oil/gas companies contract with drilling contractors that are not local businesses. They have local storage facilities for their rigs and often have local operations offices but their parent offices are in places such as Casper or Rock Springs, Wyoming; Billings, Montana; and other nonlocal areas.

There are four major oil/gas companies operating in the CAP area. Independent oil companies usually contract for drilling services whenever a rig is free from obligation to a major company. Since this is usually in the late fall and early spring, winter drilling restrictions are more likely to interfere with their operations than with major companies.

**Labor** - The average number of workers on a drilling rig totals 20 and the average number of workers on a completion rig totals 5. A total of about 300-350 people are involved in all of the well drilling and completion operations in the CAP area in a typical drilling season. Assuming 8 drilling and 8 completion rigs on average in the CAP during a normal season, about 200 of these are rig workers. Of the 200, about 50% are estimated to be local residents.

The average work week is about 48 hours (the range is 42, 48, and 60). The average wage per hour for drilling and completion rig workers is \$10.75 (the range is \$9-\$12.50). The average wage per hour for workers providing services to the oil/gas field activities is about \$9.50 (the range is \$8.50-\$10.50).

The local rig servicing businesses indicated that even during the drilling season - the May to November period - they often have up and down cycles in their activities. They will be extremely busy for a while and then have a week or two with little or no activity in which they have to put their employees on leave without pay. If this situation lasts very long, it is hard to keep good employees from leaving the area for work elsewhere.

**Drilling and Completion** - On average, it takes 20 days to drill a gas well and another 2 weeks to 30 days to complete it.

**Local Economy** - It is estimated that 10-15% of the total direct costs of drilling and completing a well are paid to entities outside of the four-county area. Between 85-90% of the total direct costs are paid to entities within the four-county area. About 45% would flow into Sublette County and 45% to the other three counties. Most of this would be going directly to the local CAP communities.

If these figures are multiplied times the 54 wells that were completed in the CAP area in 1989, the total direct economic benefits to the local communities of well drilling and completion (not counting other employee and company expenses in the area, or the subsequent indirect effects of such oil/gas related expenses) would be between \$18 million and \$20 million.

Estimates on nonwell drilling expenses indicate that the four-county area receives about \$2.3 million annually from these added expenditures of the oil/gas companies and their employees. Of this total, Sublette County and the local CAP communities receive between \$1.1 million and \$1.7 million annually. These latter expenditures are based on the current May to November well drilling/completion period.

### Wildlife and Recreation

Antelope and sage grouse hunting is the major form of recreation that occurs in the CAP area, primarily with the use of 4WD vehicles. The CAP area reportedly provides 800-1,000 days of ORV related recreation each year and it is estimated that antelope hunting accounts for at least 50% (400-500) of these ORV days. Based upon WGFD data, an antelope hunter day is valued at approximately \$100 in this analysis. At this value, antelope hunting days would have an annual total value of between \$40,000 and \$50,000.

The Piney antelope hunting area No. 89 includes the CAP area. In 1989, WGFD reported 785 antelope hunter days with a harvest of 275 antelope.



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About 25% (200-250) of the annual ORV days in the CAP area are estimated to be related to sage grouse hunting. Based upon WGFD information, bird hunting is valued at about \$33/hunter day for this analysis. This would translate into total sage grouse hunter day values/year of \$6,600-\$8,250 for the CAP area.

The remainder of the annual ORV days would be related to viewing and general 4WD activities and have an approximate value of \$31/day, or from \$6,200-\$7,750/year.

The Green River that borders the CAP area provides 200-500 recreation days, annually, of water related activities valued at about \$31/recreation day, or \$6,200-\$15,500/year.

Most of the large mule deer herd that winters in the CAP area is not in that area during the mule deer hunting season. They are more widely distributed over South Piney mule deer hunt area (No. 143), of which the CAP area is only a part.

In 1989, WGFD reported that there were 9,368 mule deer hunter days in area No. 143. This is quite an increase over the 3,975 reported for 1988. WGFD has increased the license sales in this area to reduce the deer herd size that winters in the CAP to 38,000 animals. It has risen in recent years to over 56,000 animals because of a succession of mild winters but, by May 1990, it was estimated to have declined to 45,985 animals.

WGFD expects to lower the number of mule deer licenses in area 143 from current levels once the herd size has reached the desired level. Therefore, the 1988 hunter day figure is probably closer to normal than the elevated 1989 figure for calculating the value of area No. 143 annual hunter days. Based upon WGFD reports, a deer hunter day is valued at \$54 for this analysis. At this level, the 1989 hunter days in area No. 143 would have a total value of \$505,872/year and the 1988 hunter days a total value of \$214,650/year.

### Livestock Grazing Management

Currently, 20,603 AUMs are available for use in the CAP area. Applying the 1990 grazing fee of \$1.81/AUM yields a return of \$37,291 to the Federal Government if all of the AUMs were in use. Should livestock operators lose access to public land AUMs, they would be forced to seek private lands for grazing, but they are not available. The end result of losing access to public land AUMs would be a reduction of livestock grazing.

### Forestry

Approximately 10 to 15 cords of firewood and 5-20 Christmas trees are harvested by individuals annually within the CAP area.

Impacts from BLM related timber harvesting activities on the communities in the CAP area would not be significant. The BLM plans a timber sale of Douglas-fir during the next 10 years. The size of the sale is estimated to be 138,600 board feet of timber with a retail value of \$28,500.

## MINERAL RESOURCES

### Oil and Gas

All but approximately 763 acres or 0.04% of the CAP area is leased for oil and gas. There are approximately 416 leases within the CAP area. Most of these leases are old, having been issued prior to 1970. No special lease stipulations were appended to these older leases. There are 46 leases within the area that have special stipulations. These leases cover an estimated 29,296 acres (15.8% of the CAP area). The lease parcels which have special stipulations are shown on Map 3. All 46 leases include either the winter seasonal stipulation, the sage grouse/raptor seasonal stipulation or both. Most also contain the surface disturbance stipulation. Several leases include the special resource protection stipulation.

Oil and gas exploration and development has been occurring in the planning area since the 1920's. Currently, four major oil and gas companies operate in the CAP area. They are Chevron, Enron, Mobil, and Texaco. To date, 1,864 wells have been drilled and 1,080 are still active. The overall well density of the area averages about five wells per square mile with the density at its highest in Townships 26, 27, and 28 N., Range 113 W., where the average is 10 wells per square mile.

Associated with the wells are roads, pipelines, power lines, and production facilities. The average producing well, including roads and production facilities, requires long-term surface disturbance of about 3 acres. This figure was determined by gathering data on the average width and length of disturbance of existing oil field roads in the area and average dimensions of the existing well pads. The 3-acre figure differs from the 16.5-acre figure used in the Pinedale RMP because it represents in-field development wells, not exploratory wells. It represents long-term disturbance (i.e., the life of the well) and not short-term disturbance associated with buried pipelines, cut and fill slopes, etc. The calculations for surface disturbance are shown in Appendix E.



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Oil and gas in the area is produced from several formations and, in many cases, several productive sands within the same formations. However, the geologic formations of greatest current interest are the Frontier and Bear River formations in the southern half of the CAP area. The majority of gas wells drilled into these two formations within the CAP area were drilled on 160-acre spacing in Townships 26, 27, and 28 N., Range 113 W. (see Map 2). The gas reserves in these formations are located in porous and permeable layers of rock at depths from approximately 6,500-8,500 feet.

The variability in the production layers of formations sometimes makes it necessary to drill development wells on reduced spacing (e.g., 80-acre spacing between existing wells) to efficiently and fully develop the reserves underlying a lease or unit.

To fully develop the Frontier and Bear River Formations at 160-acre spacing in the southern end of the CAP area (Townships 26, 27, and 28 N., Range 113 W.) would require drilling about 150 more wells, while to fully develop the Frontier and Bear River Formations at 80-acre spacing would require drilling about 550 more wells. It is anticipated that a majority of the area will be developed at 80-acre spacing over the next 10 years.

There is also interest in drilling for shallower gas in the northern end of the CAP area (Townships 29, 30, and 31 N., Range 113 W.). The gas sands in this area are found at depths of 3,000-4,000 feet. The spacing for oil and gas wells in this area is 40 acres. On the basis of present activity and oil and gas operators best estimates, it is anticipated that between 60 and 80 wells will be drilled over the next 10 years in the northern area. This would not fully develop the area at 40-acre spacing.

Wyoming is fifth in the nation for the number of gas processing plants and seventh in the nation for the capacity for gas processing. The Big Piney-LaBarge field is one of the leading oil and gas producing regions in Wyoming and the United States. Enron estimates their remaining gas reserves for the Frontier-Bear River formations in the CAP area to be 1.2 trillion cubic feet. This field is a very important and valuable field because it produces methane gas that is 94-96% pure with no H<sub>2</sub>S. Natural gas is cleaner than most of the other fuels our country burns. The wells are long-lived with good production.

Total production of oil and gas in 1988 (latest available data) for the producing units within the area was approximately 58,558 million cubic feet of gas (mmcf) and 1,032,997 barrels of oil. According to BLM resource specialists, the average value of natural gas in the CAP area in 1988 was \$1.26 per thousand cubic feet (mcf), oil averaged \$15.05/barrel, and roughly 12.5% of the value of area oil and gas

production in 1988 was paid as royalties. If these values are applied to CAP area production in 1988, gas output had a market value of almost \$73.8 million, resulting in royalties of almost \$2 million. Total cumulative production as of 1988 was approximately 1,605,843 mmcf and 87,481,809 barrels of oil. Most of the new wells are completed as gas wells. The analyses of impacts to oil and gas are related to changes in numbers of wells, changes in production, and the effects on the oil and gas industry.

Gas from the Enron wells, as well as most of the gas produced in the Big Piney-LaBarge field, goes to the Opal gas plant located 40 miles south of LaBarge. This plant produces 250 mmcf/day. It is capable of producing 425 mmcf/day. Of the processed volume, 200 mmcf/day goes to northern Nevada, Idaho, Washington, and Oregon. The Coastal Interstate Gas spur receives the other 50 mmcf/day which helps supply parts of Kansas and northern Texas. Approximately 1,000-2,000 barrels per day of natural gas liquids (NGL) composed of propane and butane are produced at the Opal plant of which  $\frac{2}{3}$  are from gas produced in the CAP area. According to the Monthly Energy Review, April 1990, produced by the Energy Information Administration, consumer grade propane averaged 24 cents per gallon in the U.S. in 1988.

There are 42 gallons of propane/barrel; therefore, the production of the Opal plant in 1988 had an approximate market value of \$10/barrel or between \$10,000 and \$20,000 per year. Between \$6,700 and \$13,400 is attributed to gas production in the CAP area. The average yield is 1.6-1.8 barrels of NGL per mmcf of gas. The gas is 94-96% methane.

The decline curve for the gas wells varies with the permeability, porosity, and pressure of the formation being produced. A decline curve is defined as a graph of the decline in production of an oil or gas well or a group of wells. Production rate is plotted against time. The curve is used to predict ultimate recovery and, therefore, the projected life of the well. Enron's production from the Frontier-Bear River formation, which is 75-85% of the current production, has a 10-15% annual decline. Chevron's production from the same formation has a decline curve of 8% while Mobil's decline curve is around 5%. The oldest wells are 60 years old. With 80-acre spacing, each well is projected to produce for 30-50 years or more.

With 160-acre spacing, the wells could be expected to produce for 75-90 plus years. Chevron is presently trying to accelerate production to a 25-30 year well life for more cost effectiveness. Initial production is projected at between 1.0 mmcf and 3.5 mmcf per day. The economic limits of a well, depending on depth and current market price, may be reached when production declines to about 15-30 thousand cubic feet of gas per day (mcf/day) in the shallow wells and 25-50 mcf/day in the Frontier



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formation for Enron. Chevron's economic limit is estimated to be around 100 mcfg/day per well. Mobil's economic limit is estimated to be around 35 mcfg/day per well.

Approximate current gas daily production for the CAP area is 50% from Enron with 120-130 mmcf, 21% for Mobil with 48 mmcf, 14% for Chevron with 32 mmcf, and 11-18% for Texaco and other producers with 24-40 mmcf. Each gas well is estimated to produce from 1-3.5 mmcf/gpd, currently valued at \$1/mcf in summer to \$1.52/mcf in winter.

Present average price for natural gas per mcf was \$1.82. In 1988, the average price of natural gas was \$1.26. The royalty received is 12.5% of \$1.82 or 23 cents per mcf (1988; 16 cents per mcf) and the State of Wyoming would receive 50% of the royalty. In 1989, Wyoming generated a Federal royalty value of \$59,280,123 out of a total Federal royalty value of \$151,917,000 - 39% - for Fiscal Year 1989 royalties. In 1988, Wyoming generated a Federal royalty value of \$57,755,902 out of a total Federal royalty of \$177,241,725 - 33% - for Fiscal Year 1988 royalties. Big Piney- LaBarge Field produced approximately 58,558 mmcf and 1,032,997 barrels of oil resulting in natural gas royalties of \$9,421,600 (.16 x 1,000 x 1605843) or 16% of total Wyoming royalty revenues. This includes royalty from oil and gas produced from Federal leases.

**Produced Water** - Approximately six (6) million barrels of produced water are disposed of each year in the CAP area. Three methods of disposing of produced water are employed.

1. Evaporation of produced water from small pits is used on wells that produce 5 barrels of water or less per day.
2. Injection of the produced water into subsurface aquifers through the use of approximately 70 injection wells throughout the CAP area.
3. Hauling the produced water to commercial disposal pits.

These methods are adequate for present disposal and should remain adequate, even if the amount of produced water increases as the field ages. Twenty-nine (29) injection wells are currently "shut-in," and opportunities for new injection horizons are numerous.

**Safety** - Safety is extremely important around rigs and facilities. Rig work involves machinery which demands constant attention and can be dangerous. Deaths have resulted on rigs from accidents involving carelessness, fatigue, or equipment failure, alcohol/drugs. Traffic to and from rigs and facilities also contributes to accidents if safety is not a

conscious effort among the workers as they travel. On-site accidents at facilities can also occur. The workers must be educated and proficient at using the equipment. Industry often finds it difficult to rapidly expand drilling and completion programs due to the lack of trained and experienced crews.

Winter drilling in Wyoming involves additional costs and presents safety hazards. The drilling process involves using water which is generally all over the floor of the rig where the majority of the work occurs. During the winter, this water can freeze and cause hazardous working conditions. The pipe is also wet and cold. Frostbite and loss of mobility due to extreme cold is not uncommon. When high winds are blowing, hazards are increased because of the wind chill factor which can reach or exceed -80°F. The cold and wind tire the workers, reducing their mobility and increasing chances of frostbite or accidents.

**Hazardous Materials** - The oil and gas industry uses hazardous materials during the development of oil and gas wells. This is a legitimate use of these chemicals; however, the BLM must insure that public health and safety is protected on BLM administered public lands and Federal and State environmental regulations are adhered to.

Should public land become contaminated with hazardous materials, the sites will be reported, secured, and cleaned up according to applicable Federal and State regulations. The parties responsible for the contamination will be held liable for cleanup and resource damage costs as prescribed in State and Federal regulations.

## Solid Minerals

**Leasable** - The only solid leasable mineral known to exist within the CAP area is coal. Several formations found here contain coal beds including the Adaville, the Fort Union, and the Mesaverde. Surface outcrops of low quality Adaville coals have been mined on a very small scale in the past. Coals in the other formations are found in the subsurface at a depth of 1,000 feet or greater.

Commercial interest in these coals has been low and is expected to remain so. There is no known interest in coal bed methane development at this time.

**Locatable** - No valid mining claims exist within the CAP area. The probability for the occurrence of any hardrock minerals, other than gold, is very low. Some gold is present in deposits laid down by the Green River and its tributaries.



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**Salable** - Extensive deposits of alluvial sand and gravel can be found on many of the benches and stream bottoms within the CAP area. The BLM currently has six gravel pits open and available for the sale of sand and gravel. These pits have been used extensively in the past for road work, highway use, and oil and gas development activities.

Extensive reserves remain in these designated pits although the unprocessed material is decreasing. Assuming the entire 110 acres of designated pit areas contain gravel, an approximate 1.2 million cubic yards of material remains. Decreasing this by half to account for reject and unsuitable material (i.e., over-size, clay), approximately 15 years reserves remain. Approximately 40,000-45,000 cubic yards are used per year at the current elevated development rate.

The BLM will continue to sell sand and gravel and should be able to keep up with demand using existing pits. Pit operations will fall under the same constraints as other surface disturbing activities.

## WILDLIFE HABITAT

**Mule Deer** - The CAP area includes about 138,000 acres of crucial mule deer winter range (70% of the CAP area, See Map 7). This winter range is a portion of the Big Piney-LaBarge winter range, which includes about 215,723 acres and is used by the largest proportion of wintering deer in the Wyoming Range herd unit (an estimated 35%). The current WGFD post-season population objective for this herd unit is 38,000 mule deer.

The average deer density (when this population is at objective level) on the winter range is 49 deer per square mile. However, winter-long densities of 100-150 deer per square mile are common on certain highly preferred range such as in the Dry Piney Creek area and the Birch Creek unit.

Certain areas such as Bird Draw, Yose Canyon, and the Green River may host over 500 deer per square mile during severe winter conditions. Although deer distribution changes according to weather conditions, predictions of where densities will be highest are possible based on historical information from WGFD.

Mule deer move out of the high country in the Wyoming Range mountains on to winter ranges in mid to late November but migration can occur earlier if cold temperatures and snowfall hit in October. Deer remain on winter ranges into late April or early May, depending on snowmelt and warmer temperatures which initiate growth in grasses and forbs.

Animal condition in late fall is a primary factor to winter survival. Animals with adequate fat reserves

are most likely to survive the winter. Some winter mortality can be expected even under the best of circumstances; however, stress from human activity can cause additional mortality above what would be considered normal, especially during a severe winter.

The Wyoming Range deer herd has a history of severe fluctuation, although accurate population estimates are not available prior to the mid-1970's. Declines are attributed to severe winters while increases are due to mild winters.

Severe winters in 1978-1979 and 1983-1984 caused heavy deer mortality and the population was well below the herd unit objective in the spring of 1984 (16,643 animals by WGFD estimations). Mild winters since then allowed the population to increase to an estimated 56,755 deer (1989 post-season population estimate).

Increased harvest and 1989-1990 winter mortality has reduced the estimated population level to 45,985 animals as of May 1990. Current harvest strategy designed by WGFD includes longer seasons, allowance for either sex hunting, and additional doe/fawn licenses. The WGFD goal is to bring the population down to the objective level of 38,000 deer within 5 years.

Considerable effort has been invested on the Big Piney-LaBarge deer winter range by WGFD. The Big Piney-LaBarge Mule Deer Winter Range Evaluation was designed by BLM and WGFD in February 1988, and completed in September 1989. The evaluation includes a detailed habitat description of deer winter range, transition range, and yearlong range on a 400,105-acre evaluation area within the Big Piney and LaBarge front of the Wyoming Range Mountains. This project area includes all of the CAP area and extends up to the USFS boundary to the west and Fontenelle Creek to the south. The evaluation identified habitat improvement projects to be implemented by BLM and WGFD in order to enhance and develop mule deer forage.

Continued high deer populations may hamper treatment objectives due to continued overbrowsing of treated areas by wintering deer. The majority (over 60%) of the winter range surveyed is in fair to poor condition. The primary factors causing the deteriorated range condition are advanced age structure of shrubs (oil shrubs are occupying most of the growing space to the exclusion of seedling and younger shrubs), and heavy utilization by deer. Much of the sagebrush is old (in excess of 60 years) and decadent (in a state of decline with 25% or more of dead branches). The winter range is simply not producing the deer forage it did in the past, especially in the 1940's and 1950's when the browse was probably at peak production, and will continue in a downward trend without some form of vegetation manipulation and population reduction.



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Livestock grazing also impacts deer forage availability, especially when cows eat preferred deer forage such as saltbush and winterfat. However, livestock grazing has been a benefit to browse production in the long term.

Livestock use (spring-summer-fall) has concentrated on grasses, which has promoted browse production, favoring deer habitat conditions. Sagebrush spray projects, designed and implemented in the 1960's to increase livestock forage, initially decreased deer browse production, but now provide some of the more vigorous and productive browse production in the CAP area. Properly managed livestock grazing can benefit deer winter range by promoting healthy stands of browse, but cattle utilization of species such as saltbush, winterfat, bitterbrush, and mountain mahogany must be minimal to accomplish maximum deer benefits.

Fences, if built across deer migration zones or in areas of heavy deer concentrations, can inhibit deer movements and cause direct mortality when the deer become entangled in the wires. The highway fencing is of particular concern and heavy deer mortality occurs during severe winters from collisions with vehicles. Deer tend to congregate along the highway and, with the 45-inch high fence, 100 feet on either side of the roadway, collisions between motorists and deer are common between Big Piney and LaBarge. Range fences can be built to specifications that create easier negotiation by deer and are often in areas where motorists are not as likely to be travelling at such high speeds.

Oil and gas operations have removed approximately 3,200 acres of habitat for production facilities and impacted productivity on about 8,000 acres, some of which is of little value to deer due to unsuccessful reclamation. Disturbed areas from past energy development are in various states of recovery due to past reclamation techniques which range from no reseeding at all to reseeding of a variety of plants, including important deer forage species (limited to the past few years only).

**Elk** - - The primary habitat of concern for elk is winter range. Four supplemental elk feed grounds have been established west and north of the CAP area along the foothills of the Wyoming Range. About 17,000 acres of crucial elk winter range lie within the CAP area near the Hogsback Ridge and Cretaceous Mountain, (See Map 8). Much of the elk range overlaps the deer and moose crucial winter range. This area is protected by winter range mitigation and has received little opposition from industry, as elk avoid areas of human activity in a natural setting.

Elk in the CAP area are part of the WGFD Piney Elk Herd Unit. Like the Wyoming Range deer, the elk population has increased due to recent mild winters to above the herd unit objective.

Harvest strategy is designed to increase the female segment of the population and reduce the herd to the objective level (2,424 animals). Although the elk are above objective (2,983 animals estimated as of 1988 post-hunt) the winter ranges do not appear to be in poor condition. This is probably due to the elk feed ground operations which relieve the pressure on native ranges.

The elk winter range contains numerous roads and well facilities and is accessed daily by oil and gas personnel. In spite of this situation, elk continue to use these areas.

There is minimal conflict with livestock grazing. Most elk use is on higher country (i.e. the Hogsback) where steep slopes and lack of water limit cattle use.

Elk numbers have been low in recent years (50-75 wintering animals), as these areas are on the eastern limits of the winter range and winter conditions have been mild, allowing elk to remain at higher elevations to the west of the CAP area. Under more severe winter weather, elk use could become high in areas where cattle grazing is more prevalent. Also, elk tend to be less traditional than deer in their choice of winter habitat and may populate more of the CAP area as time goes on.

**Pronghorn Antelope** - Pronghorn antelope occupy the CAP area in significant numbers during all seasons. Winter range is the primary habitat of concern. See Map 8. Populations are well above herd unit objectives due to recent mild winters. These pronghorns are members of the Sublette Herd Unit (population objective 19,400 animals). The density of antelope is estimated at 7 per square mile on the winter range or about 450 animals in the CAP area.

The WGFD post-season estimate for this herd unit in 1988 was 32,350 animals. The population objective is outdated and based on inaccurate data from the late 1970's. Efforts at setting a more realistic population objective are underway. This herd falls under three WGFD Game Division administrative districts.

About 41,000 acres (21% of the CAP area) of antelope crucial winter range occurs on the eastern portion of the CAP area and overlaps the crucial deer winter range. During the more severe winters, pronghorns move south and east onto the crucial wintering area between Big Piney and LaBarge near the Green River.

There is some mixing with the West Green River Herd Unit pronghorns during winter. A study of the Sublette Antelope Herd was conducted from 1985-1989 by WGFD and is available in the 1988 District 4 WGFD Annual Big Game Herd Unit Report.

Conclusions from this report that have applicability to the CAP include: (1) large numbers of antelope follow specific migration corridors every year with



## AFFECTED ENVIRONMENT

individuals remaining strongly loyal to these routes, (2) winter distribution is largely determined by weather conditions, (3) fidelity to summer ranges is strong among doe antelope, and (4) water availability restricts antelope summer distribution and movements and may affect fall-winter migrations.

While this helps provide continuity in application of the winter range constraints, it exacerbates an already critical situation, that of poor browse conditions. Mule deer and antelope eat the same type of forage in the winter and both depend on sagebrush as the staple food source. Population management for pronghorns is just as important to recovery of range forage quality as deer population management.

In October, pronghorns begin heading toward winter ranges. Groups of 300-500 pronghorns are common on winter ranges and may run from a single vehicle. During spring and summer, pronghorns are typically in smaller groups (often consisting of a few does with their fawns) and do not seem to be as excitable as when they are in the big wintertime groups. Although pronghorns will return to the same general area during the winter, the amount of movement is more weather dependent than with deer. This behavior can result in less impact to a given stand of browse than deer foraging which typically takes place in the same area year after year.

**Moose** - Moose habitat occurs predominantly on private lands in the CAP area along North, Middle, South and Dry Piney Creeks, and the Green River, (Map 8). Where crucial moose winter range occurs on BLM managed lands or minerals (about 6,000 acres out of 26,400), it is protected by winter range restrictions. It is estimated that 100 moose summer and 400 moose winter in the CAP area, mostly along creek bottoms.

**Upland Game Birds** - Sage grouse are the primary upland game bird in the area. Known leks are shown on Map 8. Inventory by WGFD for other leks in the area is scheduled for 1991. Sage grouse breeding occurs in early April, but hens that lose their nests may return to the lek into May to breed. Hens lay eggs over a 10-day period following fertilization and eggs take 25-27 days to hatch.

Most broods are out of the nest by late June, although fresh hatchlings have been observed as late as mid-July. Sage grouse are dependent on sagebrush for food, cover for nests, winter cover, and protection from predators. Several studies have shown that the majority of sage grouse nests are located within 2 miles of the lek when suitable nest cover is available (sagebrush canopy of 20-30% and height averaging 16 inches).

Sage grouse populations are currently low throughout Wyoming. The 1990 hunting season for sage grouse has been shortened by WGFD due to low grouse numbers. Average annual winter mortality for sage grouse is between 65% and 75%. Recent drought conditions reduced forb and insect production, which are important food items for chicks, cold and wet weather during hatching may result in high chick mortality, and a very controversial theory that sage grouse are cyclic.

Other upland game birds that may be found in the CAP area include ruffed grouse, blue grouse, and mourning doves. Ruffed grouse are typically associated with aspen-sagebrush vegetative association. Blue grouse are found in the higher elevations in association with coniferous trees. Mourning doves nest throughout the CAP area.

**Raptors** - Birds of prey (raptors) known to nest in the area include golden eagles, prairie falcons, red-tailed hawks, Swainson's hawks, ferruginous hawks, northern harriers, osprey, goshawks, merlins, and kestrels.

Golden eagles, kestrels, and red-tailed hawks use both cliffs and trees for nesting; osprey, goshawks, and Swainson's hawks primarily nest in trees; prairie falcons and merlins nest on rock ledges; ferruginous hawks nest on the ground or in trees; and northern harriers nest exclusively on the ground.

The highest density of nesting raptors occurs along the Green River, where cottonwood trees, cliffs, and riparian cover provide quality habitat for all of the raptors in the area. The cliffs and juniper trees on the Hogsback, Cretaceous Mountain, parts of the Deer Hills, and the area between the Calpet Road and Highway 189 provide nesting habitat for golden eagles, prairie falcons, merlins, kestrels, and red-tailed hawks. Nests are often discovered in these areas when a field check on an APD is undertaken, at which time the restriction to protect nesting raptors may be attached as a condition of approval to the use authorization.

**Threatened and Endangered Animal Species** - T&E species known to occur in the area include bald eagles, whooping cranes, and peregrine falcons. The black-footed ferret may occur, but has not been documented. Grizzly bear and gray wolf do not currently inhabit the CAP area, although they appear on the FWS species list as needing attention in the biological assessment. Three downstream fish, the Colorado squawfish, humpback chub, and razorback sucker may be affected by actions proposed for the CAP area, although they reside out of the project area.

Bald eagles are present in the project area during spring and fall migrations and during the winter. A



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pair of bald eagles have nested successfully on the Green River near Daniel every year since 1986.

Similar habitat provides potential nesting opportunity on the Green River in the CAP area. During winter and migrations, eagles venture well into the CAP area foraging on carrion provided by big game winter mortalities.

Whooping cranes may be present during spring, summer, and fall in wet meadows along the North, South, and Middle Piney Creek drainages. These birds are present in this area due to the cross-fostering of whooping cranes with sandhill crane parents experiment carried out at Grays Lake National Wildlife Refuge since 1975.

The birds sometimes stop on migration from summer habitat at Grays Lake and winter habitat in New Mexico. Some birds have remained the entire summer. Most of the area providing whooping crane habitat is private land, although some areas are under BLM mineral jurisdiction.

Peregrine falcons migrate through the area in spring and fall. Although no nests have been documented near the CAP area, suitable habitat exists along the Green River, especially across the river from the town of LaBarge. A peregrine was sighted on Piney Creek on the western edge of the CAP area in the spring of 1990. Peregrines are currently being introduced to the Upper Green River Valley near Fremont Lake.

Although the presence of black-footed ferrets has not been confirmed in the area, prairie dog towns capable of supporting ferrets are present just north and east of Big Piney.

A small dog town exists in the Birch Creek unit, just west of Highway 189, which has not yet been searched for ferrets. Other prairie dog colonies in the CAP area appear to be too small to support ferrets based on the FWS guidelines, although a thorough inventory is needed.

**Waterfowl** - Waterfowl use of the area is heavy on the Green River, especially in backwater sloughs and ponds on islands in the river. Larger reservoirs such as Sixty-Seven Reservoir also host locally heavy waterfowl and shorebird populations. Migration waterfowl in the spring and fall will use stock reservoirs as resting areas throughout the CAP area. The potential exists for some waterfowl mortality in mud pits and produced water disposal pits associated with oil and gas drilling, especially during migrations.

**Fishes** - None of the streams that occur predominantly on BLM administered public lands are capa-

ble of supporting fish year-round, although Pinegrove Creek has hosted Colorado cutthroat trout in wet years.

Fish known to occur in the CAP area include Colorado River cutthroat, brown, rainbow, and brook trout; mountain whitefish; Mottled sculpin; mountain sucker; and speckled dace. Habitat improvements have been installed on Pinegrove and Dry Piney Creeks under direction of the East Front Aquatic Habitat Management Plan (HMP). Further improvements may occur after revision of the HMP, although opportunity in the CAP area is low, as most of the streams that support fish are in private ownership.

## LIVESTOCK GRAZING MANAGEMENT

The Big Piney-LaBarge CAP area includes all or part of 27 livestock grazing allotments. Range condition, like wildlife habitat, has declined due to natural and human influences. BLM's grazing management attention in the CAP area concentrates on five "Improve" ("I") and one "Maintain" ("M") category allotments. Management will emphasize watershed improvement and stabilization, intensified grazing management, and improved livestock forage on these six allotments. A discussion of the six key allotments follows. Refer to Map 9 for Grazing Allotments and Existing Range Improvements.

1. The North LaBarge Common Allotment is a high priority "I" allotment encompassing approximately 131,833 acres (121,336 acres public, 5,212 acres of State lands, and 5,285 acres deeded). It is currently divided into eight pastures. Eight range users are licensed for 14,501 public AUMs in conjunction with 4,897 private and State AUMs. The BLM also manages grazing use on 7,633 acres with 1,200 AUMs on USFS land included in the Pinegrove and Trail Ridge pastures located outside the CAP area. Dates of use for the allotment are May 15 to October 15. (See Appendix K.)

There are close to 600 miles of roads, over 1,200 well locations, and numerous miles of pipelines throughout the allotment. It also includes much of the crucial mule deer winter range. The forage lost due to this development has not been accounted for in the current forage allocations within the CAP area.

In the 1950's, several thousand acres of sagebrush were sprayed and allocation was increased accordingly. Most of these sprayed areas have been partially reinvaded with sagebrush. The historical cu-



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mulative effects of surface disturbance and 20-30 years of regrowth on many acres of treated sagebrush have diminished available forage to a level which may be below the current allocated level.

The 1961-1962 range survey indicated approximately 7,100 AUMs available forage in the six pastures which make up the management system in the northern portion of the allotment. Current licensed grazing use is approximately 12,778 AUMs for the eight livestock operators in these six pastures. The 11,500 acres of sagebrush spraying increased the carrying capacity by an estimated 1,600 AUMs. This leaves an apparent over-obligation of licensed use of approximately 4,078 AUMs (32%) according to the 1961-1962 range survey. These figures are questionable and accurate forage availability for this allotment must be established.

Several years of substantial voluntary nonuse on the part of three users helped to avoid major problems. Two of these users are considering reactivating their nonuse in order to graze more cattle.

The rest rotation grazing system designed for this allotment in 1972 has not been successful. Topography and range readiness factors, particularly on those pastures designed for summer use (Cretaceous, Pine Grove, and Trail Ridge), have limited the use on these pastures and put excessive pressure on the other pastures. The proposed system should account for these limitations and minimize the extended use periods on any one particular pasture. (See Appendix K.)

Another problem in the North LaBarge Common Allotment is the lack of livestock water and poor livestock distribution in the Big Mesa pasture. Big Mesa pasture includes 40,000 acres but has useable water only in small portions of the pasture. (See Map 9 for Existing Range Improvements.) The area between Highway 189 and Big Mesa is susceptible to erosion, with most of the reservoirs silted in or washed out. If adequate water projects were developed, large areas of unused forage could be made available in the Big Mesa pasture.

The North LaBarge Common Allotment has two southern pastures, the Calpet and Black Canyon pastures. These pastures have been part of the North LaBarge Common Allotment in name only. They are not being used as part of a grazing system with the rest of the allotment and only two users have allocated AUMs in these pastures. Black Canyon and Calpet pastures will soon become an allotment separate from the North LaBarge Common Allotment. The new allotment will be referred to as the **Calpet Common Allotment**. Three smaller pastures (State, Jory, and Middle Sawmill pastures), made up of primarily State and private land, will be included in the Calpet Common Allotment, allowing for a more manageable deferred grazing system. Refer to Map 10

for pasture locations and Appendix K for pasture number and size.

JF Ranch plans to fence the State land to create an additional pasture. Plans to fence the Calpet pasture (east to west), to create a north and south pasture, can be pursued if adequate water is developed on the south side.

An AMP for the Calpet Common Allotment will not be completed as part of this CAP because parts of the allotment are outside the CAP area and additional considerations are necessary for resources in those parts of the allotment.

As projects are developed, the grazing system may be modified or refined based on monitoring data. Every attempt has been made to develop an effective and efficient grazing scheme that protects not only the range resources, but also facilitates the permittee's grazing operations. (See Appendix K.)

2. The Deer Hills Individual Allotment contains 5,886 acres and provides 698 AUMs of forage for one livestock operator. It is a high priority "I" allotment.
3. The Deer Hills Common Allotment contains 6,850 acres and provides 731 AUMs of forage for three livestock operators. It is also a high priority "I" allotment.
4. The Dan Budd Deer Hills Allotment is an "I" category allotment. It contains 3,030 acres and provides 293 AUMs for one livestock operator.

The three allotments in the Deer Hills area are "Improve" ("I") category allotments because of accelerated erosion problems. The soil erosion has caused many of the reservoirs to be filled with silt, resulting in washed out dikes. In addition, some of the original reservoirs were poorly located which resulted in erosion and loss of the use of the reservoirs for livestock water. To alleviate gully erosion and provide better livestock distribution within the Deer Hills Individual and Dan Budd Deer Hills, several improvements are needed.

5. Two pastures of the Upper North LaBarge Allotment (Hogsback and Gentle Annie) are included within the CAP area along the west edge. This area includes approximately 4,100 acres and provides 520 AUMs of forage for one livestock operator. The balance of the allotment is outside the CAP area. This allotment is also a high priority "I" allotment due to lack of adequate livestock water, gully erosion, steep terrain, and crucial elk winter habitat. In fact, most of the Hogsback pasture is unavailable to livestock due to a lack of water. (Refer to Map 9.)
6. The O'Neil Individual Allotment is a "Maintain" ("M") category allotment within the CAP area adjacent to South Piney Creek. It contains 640



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acres of public land and provides 80 AUMs of forage for one livestock operator. The range user would like to implement a brush beating project to increase forage production for livestock in this allotment. This is consistent with WGFD proposals to rejuvenate decadent stands of sagebrush on mule deer winter range.

Finally, energy development has disturbed an estimated 3,202 acres within the CAP area. At an average carrying capacity of 14.5 acres per AUM, an estimated 220 AUMs of livestock forage have been lost.

## VEGETATION/RIPARIAN

The predominant vegetation in the CAP area is sagebrush/grassland (139,757 acres or 71%) and sagebrush/salt desert shrub (43,305 acres or 22%). The CAP area also includes small acreages of mountain shrub/sagebrush (3,937 acres or less than 3%) and riparian/willow (1,620 acres or 1%). Private lands contain considerably more riparian/wetlands but the acreage of these areas is not available.

Range conditions on upland ranges or riparian areas have not been assessed using currently accepted procedures. However, long-term observations by resource specialists have identified problems that could lead to substandard range conditions in site specific areas. Generally, it is believed utilization levels on most of the upland range by livestock is less than 40% with some areas not utilized at all because of lack of water. It follows then that the majority of upland range would be in satisfactory condition from a livestock grazing standpoint; however, riparian areas and areas near water have been subject to over-utilization. Range conditions in these areas would be expected to be unsatisfactory. Livestock distribution problems have been identified in the Dan Budd Deer Hills, Deer Hills Common, North LaBarge Common, and the Upper North LaBarge Allotments. These areas of overuse represent a small percentage of the CAP area acreage wise, but some important acreage including riparian areas.

Vegetative condition has been assessed from the standpoint of wildlife habitat. The majority (over 60%) of the winter range surveyed was in fair to poor condition. The primary factors causing the deteriorated range condition are advanced age structure of shrubs (old shrubs are occupying most of the growing space to the exclusion of seedling and younger shrubs), and heavy utilization by an overabundance of deer. Much of the sagebrush is old (in excess of 60 years) and decadent (in a state of decline with 25% or more dead branches). The winter range is simply not producing the deer forage it did in the past, especially in the 1940's and 1950's

when the browse was probably at peak production, and will continue in a downward trend without some form of vegetation manipulation.

There are no threatened or endangered plant species that are known to exist in the CAP area.

## FOREST RESOURCES

The CAP area contains approximately 2,180 acres of trees occurring in 63 individual tree stands. Individual tree species found in the CAP area include 926 acres of Douglas-fir (42%), 1,062 acres of aspen (49%), and 192 acres of narrow-leaf cottonwood (9%).

The cottonwood stands are located along the eastern edge of the CAP area, adjacent to the Green River. Most (approximately 90%) of the Douglas-fir and aspen occur on the Hogsback and Cretaceous Mountain along the western edge of the unit. The remainder of the Douglas-fir and aspen are found scattered throughout the analysis unit.

Only 316 acres of Douglas-fir on the west side of the Hogsback are suitable for commercial timber harvesting. The rest of the tree stands are either too small, too isolated, or they are growing on slopes and soils too steep or too fragile and erosive to be suitable for timber harvesting. In addition, there is presently little or no commercial value for the aspen or the cottonwood in southwestern Wyoming.

One commercial timber sale is proposed within the CAP area in Fiscal Year 1995. The sale would occur in the 316-acre Douglas-fir stand on the west side of the Hogsback and would selectively harvest trees from approximately 70 acres in three separate partial cut units. The sale would be designed to remove trees that are infested with or are susceptible to attack by various insects, parasites, or disease. Additional information concerning the proposed timber sale can be found in the Pinedale 20-year Timber Harvest Schedule/Forest Management Plan on file in the Pinedale RA Office.

## SOILS

Soils information, gathered for the CAP area, is included in a Big Piney-LaBarge Coordinated Activity Plan Soils and Vegetation Technical Report and is available for review at the BLM Pinedale Resource Area, Rock Springs District, and Wyoming State Offices. The soils information for the technical report is derived from three previous soil surveys, parts of each, when combined, include the CAP area.



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The Big Piney-LaBarge survey (1984) covers the eastern half of the CAP area while two Riley Ridge Natural Gas Project EIS surveys, Bio/West (1982) and ERT (1982), cover the western half. The two Riley Ridge surveys have been compiled into the Riley Ridge Natural Gas Project EIS Soils/Vegetation/ Reclamation Technical Report (1983).

Because these three surveys were mapped by different contractors, there are discrepancies in quality and correlation of mapping units where the surveys join. The Riley Ridge Technical Report correlates Bio/West to ERT mapping units as well as possible. (See these correlations at the beginning of the Soils Characteristics Table in the CAP Soils and Vegetation Technical Report.) As in all Order 3 soil surveys, the soils lines and components are variable and are designed for large-scale planning purposes such as a CAP. Site specific investigation is prescribed for more detailed information, especially in the Bio/West surveyed area.

The CAP Soils Technical Report identifies 100 separate soil series, correlates them to a soils map, and describes the soil characteristics. Characteristics described for each soils series include range site, depth, texture, pH, salinity, and susceptibility to wind and water erosion. The report also describes suitability to various uses (e.g., road fill, reservoir, shallow excavations, etc.) and management considerations (suitability to reclamation, susceptibility to erosion, etc.). This information was key in developing the erosive soils map, entitled Special Management Soils (Map 4). It will be used as a tool in planning access routes and well pads, building stock reservoirs, developing reclamation prescriptions, and designing vegetation treatments within the CAP area. Due to the length and technical nature of the report, it is not included as part of this document.

Field investigations confirmed the soils or map units that need to be highlighted as special management soils. This is supported by the use criteria and limitations comments made in the soils technical report tables.

A brief description of the special management soils follows.

1. Areas of Forelle loam (map units 305, 306, 307, 308, 313) were identified as being highly erosive. This soil is commonly found on fans, side slopes, and in drainages with a loam or fine sandy loam surface. Loam is susceptible to water erosion; the fine sandy loam to wind erosion.
2. Red soils in general have a history of erosiveness in this area, especially when disturbed. These soils occur in the following units: 30, 31, 36, 75, 100, 101, 102, 104, 106, 107, 124, 219, and 322.
3. Map units 35, 306, 312, 355, and 411, occurring on side slopes and ridges, have presented prob-

lems in the past in the form of erodibility and instability. These and similar units are dominated by shallow (10"-20" to rock) and moderately deep (20"-40" to rock) soils which, due to steepness of slope, are inherently unstable both by surface flow and mass wasting.

4. Saline and/or alkaline soils are common on low fans and in drainages and will present obvious reclamation or rehabilitation problems. Other soils may have a high salt content in the lower part (substratum). Reclamation or revegetation on these soils will require particular attention. Typical saline and/or alkaline soil map units are 31, 313, 400, 401, 406, 412, 414, 415, 416, and 417.
5. Sandy soils are susceptible to wind erosion and efforts should be made to avoid disturbing these areas. Once vegetative cover is removed, these soils are highly susceptible to wind erosion, requiring some anchoring measures if stock-piled. These soils and associated map units are often found on ridges and may be possible cultural sites.
6. Many of these soils have rock fragments (gravel, cobble) throughout their matrices or in the substratum. Some of these soils have enough coarse material (i.e., sand mixed with the rock) to be potential quarry sites.

Natural erosion over the CAP area is estimated at 3 tons per acre per year.

## WATERSHED

**Surface Water** - Eleven perennial streams, involving over 80 miles, flow through the CAP area. These streams flow predominately through private lands. Most runoff is directly attributed to snow melt; however, storms in spring, summer, and fall account for high stream stages. The streams and their approximate distances are as follows:

Stream Name	Miles
North Piney Creek	3.0
Middle Piney Creek	15.0
South Piney Creek	14.0
Beaver Creek	3.0
Spring Creek	3.0
Pinegrove Creek	1.0
Pinegrove Draw	0.7
Fogarty Creek	7.0
Black Canyon Creek	4.5
Dry Piney Creek	15.0
Green River (west Shore)	17.0



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**Watershed Condition** - Watershed conditions vary from good to poor in the CAP area. Poor condition watersheds, with highly erodible soils that are susceptible to water and wind erosion, are predominant in the Deer Hills, Dry Basin, Cretaceous Mountain, Birch Creek, and Big and Little Mesa watersheds. These watersheds are in poor condition because of grazing, high deer population, ORV traffic, oil and gas exploration, erosive soils, steep slopes, natural geologic erosion, sparse vegetation, high magnitude-low frequency type floods, and drought conditions.

Surface water quality data collected in the CAP area indicates good quality water in the Green River and its local tributaries flowing in from the Wyoming Range. Total dissolved solid (TDS) concentrations range from around 100 milligrams per liter, (mg/l) to just under 500 mg/l. Water with a concentration greater than 500 mg/l is considered unfit for human consumption, by EPA. Area waters do not depart in any significant amount from the EPA recommended standards for the protection of fish and other aquatic life. Protection of this good quality water depends upon watershed management.

Water quality is dependent on the application of best management practices. The biggest interaction with water quality is the design, location, and construction of roads. Roads are considered as contributing the greatest sediment load in stream channels. The second biggest contributor to sediment and salinity in streams is well pad development and placement. Past sediment samples taken from the Green River at LaBarge have shown that the average sediment yield is roughly 36,500 tons per year for the entire Green River drainage above LaBarge, Wy.

Overgrazing by domestic livestock and wildlife is also a contributor to sediment and salinity loading of streams.

Road design and placement is paramount for insuring that sedimentation and salinity contributions to stream channels are kept to a minimum. In addition, proper planning, placement, and reclamation of well sites can reduce the erosion and salinity problem.

Construction of watering facilities away from riparian and wetland areas has provided a means of reducing grazing impact. This, coupled with implementation of various grazing systems, has helped to alleviate some of the impact to the riparian areas. The problem of riparian and wetland overgrazing has not been solved, but steps have been taken to rectify the problem.

To correct past erosion problems related to road and well pad placement and grazing, BLM Standard Practices or best management practices have been implemented. This involves reduced grazing in riparian and wetland areas; restrictions on drilling in

floodplain and wetland areas; no surface disturbance within 500 feet of surface water (livestock waters included) and/or riparian areas; and graveling, redesign, and seasonal closure restrictions on oil field and other roads.

Construction is prohibited during periods when soil material is saturated, frozen, or when watershed damage is likely to occur. Two executive orders are also in effect outlining floodplain and wetland management. These are Executive Orders 11988 and 11900.

**Road Locations** - There are no steadfast rules regarding placement of roads in relation to active stream channels, but is determined with input from resource specialists.

**Baseline Monitoring** - Watershed conditions within several watersheds (e.g., Dry Basin, Cretaceous Mountain, Birch Creek, and Big and Little Mesa) are poor. Their poor condition affects water quality through sediment loading and salinity contributions during snow melt and runoff following storm events. Currently, there is no monitoring of the occurrence of sediment loading to determine whether concentrations are exceeding EPA standards. There is also no baseline against which a comparison can be made to determine how much erosion is occurring in excess of natural erosion.

However, the following baseline monitoring measures are being implemented:

1. A USGS water quality monitoring station is located in Sec. 27, T. 28 N., R. 113 W., that will operate from April through September for the next 5 years.
2. The BLM will sample Fogarty and Dry Piney Creeks three times during the field season.
3. A single stage sediment sampler will be installed in an undisturbed Order 2 watershed (watershed with two drainages) to determine the sediment load level. This will provide a baseline against which monitoring data will be compared. The sampler is located in T. 28 N., R. 113 W., Sections 23-26, 35, and 36.

**Groundwater** - Freshwater aquifers are found in the Wasatch and in the thrust faulted Paleozoic rock section. The Wasatch consists of fluvial deposits of sandstone, mudstone, shale, and clay, while the Paleozoic rocks are mainly limestones and dolomites.

Groundwater in the area is derived mostly from precipitation and the recharge rate is slightly less than 1 inch annually. Groundwater moves from the



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west to the east toward the Green River. It is unknown how the sand lenses of the Wasatch are interconnected. Similarly, it is unknown how the porous zones within the Paleozoic section are interconnected, or how the two different sedimentary units (Wasatch and Paleozoic rocks) are interconnected hydrologically. Communication between the different zones has important implications for contaminant transport. Groundwater ranges from 0 (surface water) to a depth of 2,000 feet. The average depth to reach groundwater is 300 feet.

Data compiled by the US Geological Service (USGS) indicates water quality in the Wasatch Formation, and which is taken from only a few wells in the area, ranges from approximately 200 mg/l TDS, to 1700 mg/l TDS. The TDS generally increase from west to east and southeast toward LaBarge, Wy. This decrease in water quality results from the water flow through the Wasatch, in which various minerals are picked up and dissolved in the ground water. The various chemical constituents are reflected in the general water types found locally, such as the relatively high sodium content found in the Big Piney area.

Water quality in the Thrust Belt Paleozoic sections on the west side of the CAP area is believed to be generally of higher quality than the Wasatch, but specific data is lacking to prove or disprove this theory. Oil seeps from springs in and near the Paleozoic outcrops has been fairly common over the past few years. It is unknown whether these seeps are natural to the area or not. Water use in the area is confined almost entirely to the Wasatch formation. Water is used for domestic and residential, stock, and industrial purposes. Local communities and ranches use water from this formation for human consumption.

Several oil seeps have been discovered flowing from both the Wasatch and Paleozoic rock sections. Based on historical data and drilling and production data, no evidence for natural hydrocarbon seepage from these rocks can be found. This fact, coupled with the intensive oil and gas development in the area, raises concern about the effect oil field activity is having on the groundwater.

## RECREATION

Recreation in the CAP area generates less than \$500,000 annually. The primary recreation activities in the CAP area are antelope, deer, and sage grouse hunting. The CAP area involves approximately 41% of antelope hunt area No. 89 and receives an estimated 400-500 hunting days.

The wildlife that winter in the CAP area provide a significant amount of hunter use days in the surrounding areas which benefits the local economies.

Fishing and river floating are popular on the Green River which makes up a portion of the eastern boundary of the CAP. There are 200-500 visitor days of water related activities. There are four identified undeveloped recreation sites along this segment of the Green River which are mainly used for fishing access and short-term camping. An estimated 50-60% of the total recreation use in the area is generated by the local population.

Most of the recreation uses in the CAP area are of a dispersed type. Visitors participate in a wide variety of activities over a broad area.

The entire Pinedale Resource Area was rated for its recreational opportunities and experiences during development of the RMP. The Recreation Opportunity Spectrum (ROS) was used. The ROS system describes probable physical settings, experiences, and activities for six classes. The six classes are: primitive, semi-primitive, nonmotorized, semi-primitive motorized, roaded natural, rural, and urban.

In the CAP area, an additional class has been added. This is the "Area of High Density Power lines and Oil and Gas Pipelines," located west of Big Piney, Marbleton, and LaBarge. Because it is so highly affected and modified by the oil and gas industry, the area does not readily fall into any of the existing ROS classes. Approximately 90% of the CAP area falls within this area. The remainder of the area falls within the rural zone.

## VISUAL RESOURCE MANAGEMENT

The Pinedale Resource Management Plan (December 1988) established the visual resource management boundaries shown on Map 11. Table III-3 shows the acreage by management class for the CAP area.

Visual resource management (VRM) classes are the degree of acceptable visual change within a characteristic landscape. A class is based on the characteristics of any area and serves as a management objective.

**Class I** - The highest rated class, near pristine. Preserve existing landscape character without attracting attention. There are no Class I areas in the CAP.

**Class II** - Retain existing character through low level change. Changes must repeat the basic natural landscape features without attracting attention. Less than 1% of the CAP area is in Class II.



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**Class III** - Partially retain existing character through moderate change. Changes should repeat the basic natural landscape features and may attract attention but not dominate view. Approximately 17% of the CAP is in Class III.

**Class IV** - Provide major modification to the landscape. Changes may dominate the view but impact should be minimized by repeating basic natural landscape features. Approximately 82% of the CAP area is in Class IV.

**Class V** - The natural character of the landscape has been disturbed to the point where rehabilitation is needed to bring it up to one of the other classes. There are currently no Class V areas in the CAP.

**Open** - Vehicle travel is permitted on and off roads if it is operated responsibly and won't cause resource damage or disturbance.

**Limited** - Vehicle travel is permitted on existing roads and routes. Vehicle travel off existing routes is permitted only to accomplish necessary tasks and won't cause resource damage or disturbance. Vehicle travel may be limited by the number or type of vehicle.

**Closed** - Vehicle travel is prohibited in the area. Access by means other than motorized vehicle is permitted.

The CAP area falls under the "limited" designation to protect all resources in the area. Some areas within the CAP have added seasonal limited designations to protect wildlife.

The types of off-road vehicles used in the area are many and varied. The four-wheel drive (4WD) is most used. The majority of these vehicles are stock pickups which are used for both on- and off-highway use.

Much of the off-highway use of these vehicles is not recreation related. Local ranchers use 4WDs and other ORVs extensively in their operations; oil companies, surveyors, government employees, and seismograph companies also make heavy use of 4WD vehicles. These uses are recognized as legitimate uses both in the RMP, and regulations (43 CFR 3809.)

Four-wheel drive use by hunters is the biggest recreational ORV impact in the planning area. Recreation use of 4WD vehicles in the CAP area is estimated at 800-1,000 visitor days per year. Other vehicles include snowmobiles, motorcycles, and four-wheelers. Dune buggies and recreational jeeps are not common.

Snowmobiles are a common ORV used in the area. Much of their use is of a practical nature. Snowmobile use occurs from December through April. The normal snow depth is such that very little resource damage is occurring. In some areas, conflicts with wintering wildlife have led to seasonal closures. There are no groomed or established snowmobile trails. The use is all cross country or following unplowed roads.

Motorcycle and ATV use is becoming more popular from May to October. There are no established areas for motorcycle or ATV use but ORV designations apply to all ORVs regardless of the purpose for which they are being used. Emergency vehicles are excluded.

The CAP area deer and antelope winter ranges have a winter travel limitation restricting vehicle travel from November 15 through April 30 on an as

TABLE III-3

### VISUAL RESOURCE MANAGEMENT CLASSIFICATIONS AND ACREAGE

VRM Classification	Acreages
I	0
II	1,360
III	30,720
IV	164,920
V	0
<b>Total</b>	<b>197,000</b>

The Pinedale RMP calls for a program to be initiated to improve the visual quality of oil fields in the planning area by working with the companies to reduce the visual impact of existing facilities. Such methods as painting, screening, and reclamation may be used.

Projects of all types (e.g., timber harvest, oil and gas activities, construction of range improvements, etc.) within established visual resource management (VRM) class areas are required to conform with the objectives and characteristics of the management class, or the project will be modified in order to meet the VRM class objective.

## OFF-ROAD VEHICLE USE

Off-road vehicle designations for the Pinedale RA including the CAP area were established in the RMP (see Map 11). The three designations are open, limited, and closed.



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needed basis. These seasonal limitations will be implemented in cooperation with the Wyoming Game and Fish Department during severe winters or periods of important conflict with the wildlife wintering in these areas. Exceptions may be granted for permitted uses.

## WILDERNESS

The CAP area borders the extreme eastern boundary of the Lake Mountain Wilderness Study Area (WSA) along the Spring Branch Creek road.

Refer to Map 1. The 13,865-acre Lake Mountain WSA was evaluated in a land use plan amendment in 1981 and was recommended as nonsuitable for wilderness designation. This recommendation was carried forward into the 1988 Pinedale Resource Management Plan and evaluated in the 1990 Rock Springs District Wilderness EIS.

The Scab Creek Primitive Area WSA is located over 40 miles to the east of the CAP area adjacent to the Bridger-Wilderness and will be unaffected by the proposal.

## CULTURAL

The CAP area is rich in both prehistoric and historic cultural resources. The area can be divided into three subregions: a southern area located between LaBarge Creek and Dry Piney Creek, a central area between Dry Piney Creek and South Piney Creek, and the northerly Deer Hills.

**General** - Sand dune formation is extensive within the CAP area, and prehistoric peoples frequently camped, hunted, gathered food, and performed other activities in these areas. Sandy soils erode and deposit in rapid succession, quickly covering cultural materials, then later exposing them in the constant erosion cycles. Because sandy soils often contain buried prehistoric sites, great caution must be taken when proposing any development of the area in order to protect cultural values.

**Prehistoric Sites: Southern Region** - The area north of LaBarge Creek is the extreme southern edge of major oil and gas drilling in the plan area. Inventory has been moderate to heavy in this area and a high site density has been observed.

**Prehistoric Sites: Central Region** - Land between Dry Piney and South Piney Creeks can be considered the central CAP region. This area has been subject to sufficient professional inventory to allow for a recognition of a diversity of site types.

Inventory in the central region is not as extensive as land to the south, so an estimate of overall site density is difficult. Over 50% of the inventory was performed between 5 and 15 years ago and is unreliable.

**Prehistoric Sites: Northern Region** - Terrain north of Middle Piney/South Piney Creeks can be referred to as the Deer Hills. Professional inventory in the Deer Hills is concentrated in the developed oil and gas areas, is generally older, and was done prior to application of strict cultural resource inventory standards.

As a result, our knowledge of prehistoric occupation in the Deer Hills is limited. BLM managed surface includes some 23,000 acres while an adjacent 20,000 acres are "split-estate" (i.e., private surface/Federal minerals). This situation has led to a complicated management scenario with non-Federal surface lands developed by non-federally permitted projects, followed by Federal involvement and cultural resource management responsibilities when an application for a drilling permit is received for a split-estate well. Nonetheless, recent investigations have demonstrated an extremely high site density and abundant significant sites.

**Native American Traditional And Religious Sites** - Sites in this category include sites and localities currently used by Native Americans for traditional religious or ceremonial activity, and prehistoric sites that suggest past religious or ceremonial activity. Site types might include medicine wheels, vision quest sites, stone circle sites, rock alignments, petroglyphs, burial sites, sweatlodges, sacred areas, caches, and altars.

Other sites not currently recognized could be included in this category. Of the listed site types, petroglyphs, burials stone circles sites, rock alignments, and caches are known for the CAP area. No sites or localities currently used or recognized by Native Americans are known. Additional inventory may identify medicine wheels, vision quest sites burials, and petroglyphs.

Because the area was one heavily used by prehistoric peoples, it is probable that prehistoric ceremonial and religious sites exist in the CAP area.



**Historic Cultural Resources** - Historic period sites are relatively abundant in the CAP area and fall into four broad categories: Emigrant Trail related, early homesteading, oil and gas extraction related, and coal mines. Other historic cultural resources will occur, but not in the numbers as these four "majors."

The Lander Road is the only Emigrant Trail located in the CAP area. This historic resource is eligible for National Register of Historic Places inclusion, and is part of the National Historic Trails system.

The first homestead in the plan area was as early as the 1860's. Some of the more important Sublette County families first settled in Wyoming in the CAP area.

The Opal Wagon Road is one nineteenth century freight/haul road located in the eastern portion of the plan area. First used in the early 1880's, the Opal Wagon Road provided freight, mail, and passenger service from the railhead at Opal to the ranches in the Upper Green.

Later, the first Upper Green River Valley telephone service and the first pipeline from the "new" well field at LaBarge used the corridor provided by the Opal Wagon Road. Because this wagon road played a critical role in the settlement of southwestern Wyoming, the Opal Wagon Road is recognized as a National Register eligible historic resource.

Oil was first discovered in the CAP area in 1907 and the first well drilled in 1912. Because the oil and gas industry played such a critical part in the historic development of the CAP area, sites associated with the early petroleum development are worthy of recordation and recognition.

Coal was mined in the CAP area as early as World War I. One recently recorded coal mine is the Salli Mine, located up Chappell Creek in the southern CAP area. This site retains considerable integrity, is associated with a person considered significant in local history, and will probably be recommended as a significant historic resource.

**Vandalism** - Uses in the CAP area have resulted in the vandalism, artifact collecting, and looting of cultural resources. Illegal artifact collecting, particularly for projectile points ("arrowheads"), is probably the most common form of vandalism noted in the area, although the looting and destruction of human burials is of particular concern to BLM.

## PALEONTOLOGY

Several fossil bearing formations outcrop within the CAP area, including the Tertiary age Wasatch/Green River sequence, and the Paleozoic age Darby and Gallatin carbonate sections. Specific sites documented in the literature are recorded on maps on file at the Pinedale Resource Area office.

Diagnostic vertebrate fossils have been found within the Main Body and the New Fork Tongue of the Wasatch Formation. Hogsback Ridge is documented as a general location for fossil trilobites and brachiopods within the Gallatin Formation, and for fossil corals in the Darby Formation. One eocene mammal locality, and an invertebrate locality are known for the CAP area.

## LANDS/REALTY

The CAP boundary encompasses a total of 196,841 acres. From this total, the State of Wyoming administers 10,536 acres of land, the BLM administers 135,785 acres of public lands, and the remaining 50,520 acres are privately owned.

The BLM administers 154,470 acres of mineral estate underlying the public lands within the CAP area. Of this 19,327 acres are underlying private lands that have had the mineral estate [either all of the minerals or portions of the minerals (i.e., oil, gas, coal, phosphate, etc.)] reserved to the United States.

In these cases, the mineral estate is administered by the BLM although the surface estate is managed by the respective private individuals. The remaining mineral estates are owned by either the State or private individuals.

**Land Tenure** - Lands which have been identified for disposal (sale or exchange) are identified in Appendix I. Public lands that are sold must meet statutory and regulatory requirements.

The parcels that would be sold involve the sanitary landfill near the Town of LaBarge. The entire CAP area is available for land exchange. Land exchanges would be pursued if a public benefit to the Government existed.

Existing and future demands for lands sales and exchanges are anticipated to remain at a low activity level. Lands disposed of would not involve a significant portion of the CAP area.



## TRANSPORTATION

There are over 730 miles of existing roads in the CAP area (Map 2). The majority of these are used for access to oil and gas wells and related facilities.

Others are used to access range and wildlife projects or are just old seismic trails that are still used by hunters and other recreational users. Many of the older existing roads were not built to an acceptable standard. Therefore, many existing roads have safety and erosion problems. Safety problems occur

on roads that are too narrow, slippery when wet or icy, do not have adequate turn-outs, or have improperly designed curves.

Accelerated erosion occurs from roads that are not adequately drained (e.g., not properly crowned and ditched or not enough culverts with riprap) or not adequately surfaced (e.g., graveled). Both erosion and safety problems increase as road grade and terrain steepness increase.

The amount and type of roads that exist in the CAP area follows:

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Miles of improved dirt roads	540 (1,571 acres)
Miles of paved roads	52 (252 acres)
Miles of unimproved roads	30 (29 acres)
Miles of unnecessary roads to be reclaimed	110 (210 acres)
<b>TOTAL</b>	<b>732 (2,032 acres)</b>

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During the last 5 years, the oil and gas operators in the area have upgraded approximately 80 miles of existing access roads by adding culverts and gravel to the roads and about 20 miles of unnecessary roads have been contoured and reseeded.

This type of work is an ongoing project with the operators and the BLM during new well and access construction, correction of erosion problems identified during field inspections, and abandoned well and access road reclamation. Many oil and gas roads are plowed during the winter to allow vehicle access for maintenance of existing wells.

Approximately 200 miles of electrical and phone lines (e.g., transmission, distribution, etc.) are authorized in the CAP area. Although some of these lines are buried, most are above ground.

There are approximately 1,000 miles of pipelines in the area. The greater percentage of the pipelines are buried. The majority of the pipelines transport petroleum products to larger pipelines to out-of-State markets.







# CHAPTER 4

## ENVIRONMENTAL CONSEQUENCES

### INTRODUCTION

This chapter is a summary of the key impacts which could result from implementation of the proposed plan, or one of the other five alternative plans considered. Most of the technical supporting data, charts, tables, and references have been inserted into a CAP Technical Report. Limited copies of this report are available from either the Pinedale Area Manager, the Rock Springs District Manager, or the Deputy State Director for Lands and Renewable Resources in Cheyenne, Wyoming.

This chapter documents the potential impacts of implementing Alternative A, representing the Pinedale Resource Management Plan (RMP) Decisions for the CAP area for all affected resource programs. It also provides analytical discussion of the other five alternatives, however, focusing upon the differences between them and Alternative A. The order of presentation of subjects is based upon public interest expressed at public meetings and through public comment letters. For ease of reading, the information is presented in an outline format to allow the reader to locate topics of interest between alternatives. A table which compares all the alternatives and impacts, along with key resource elements, can be found in the next section.

The following elements of the human environment are not addressed in any of the alternatives because they either do not exist in the study area, or because there were no apparent impacts:

ACECs, prime or unique farm lands, Native American religious concerns, threatened and endangered plant species, wild and scenic rivers, wilderness areas, coal, oil shale, locatable minerals, cadastral survey, and wild horses.

The following assumptions have been made in order to assess the environmental impacts in the CAP area. They helped to establish full scenarios for analysis purposes and represent the best information that could be gathered from numerous sources in the area, State, and region.

### ALTERNATIVE CUMULATIVE ANALYSIS SUMMARY

Cumulative impacts result from several activities occurring at the same time, and in the same general

location. The results of this interaction is a synergistic impact where the sum of the effects from all contributing activities is greater than the simple addition of the whole. In the CAP area, there are locations or time periods where oil and gas development, grazing, wildlife use, hunting, and other recreational uses are all ongoing. This does not mean that these activities all occur simultaneously, but that they all may be happening in the same location at the same or various times of the year, or their interaction may be all affecting the same element(s) of the human environment.

In the CAP area, there are four elements of the environment which require close evaluation for overall cumulative impacts. These are soil, air and water quality, and the vegetative complex. In most cases, there is not enough overlap in timing or extent for cumulative impacts to occur among the elements that have been evaluated. The following Summary Comparison Table, which compares impacts by resource element and alternative, reveals that there are **no significant impacts** which have surfaced in this EA. The impacts of activities which are managed by the Bureau in the CAP area also involve no significant cumulative impacts with the interaction of programs for soil erosion or air and water quality given proper mitigation and successful reclamation.

In the CAP area, there is a long-term accumulation of factors which has resulted in old, decadent stands of sagebrush which prevents other vegetation from vigorous growth, while not being very productive itself. The recent years of drought, the mild winters, the resulting high wildlife numbers, the continual grazing, and the removal of vegetation for other uses (i.e. roads, oil and gas facilities, work camps) has affected the overall productivity of the vegetation in the CAP area. This state of decline or decay affects the usability of the vegetation for livestock or wildlife use.

The weather patterns have had, and will continue to have, a major effect on whether the vegetative complex continues to decline or if improvement occurs. With a severe winter, the deer population will decline, reducing use of the vegetation. With increased moisture and with some manipulation (vegetative treatment), there will be more vigorous vegetative production.

Overall, no significant cumulative effects of resource management and development were found in the CAP area with existing management. Natural occurrences such as drought and wildlife population fluctuations have a much more pronounced effect on the environment of the area than man's



## ENVIRONMENTAL CONSEQUENCES

influences. While habitat degradation in the CAP area from any one activity is not deemed to be significant in the long-term from the proposed plan, continued habitat attrition and increasing human use with the higher levels of development in alternatives D and E could eventually lead to a major reduction in population of some of the more sensitive species,

or species with relatively narrow habitat requirements, such as moose or prairie falcons. Better control of human access, better reclamation efforts, and improved rangeland conditions through more rigid controls of domestic livestock and big game herds show the greatest promise for long-term, proper habitat management.

### ALTERNATIVE SUMMARY COMPARISON TABLE

ITEMS	A	B	C	D	E	F
Existing wells in CAP area	1080	1080	1080	1080	1080	1080
Total wells to be drilled	300	600	600	900	900	200
Percent change over 10 years	28%	56%	56%	83%	83%	19%
Peak year - number of wells	50	100	100	150	150	20
Wells to be reclaimed	200	200	200	200	200	200
Miles of road reclaimed	110	110	110	110	110	110
Total acres reclaimed	810	810	810	810	810	810
<b>SOCIOECONOMIC IMPACTS</b>						
Unrestricted drilling days	199	305	244	305	305	199
Direct income to area (\$MM)	\$132	\$241	\$239	\$348	\$348	\$94
<b>Oil/Gas</b>						
Net new acres disturbed for 10 year period	90	990	990	1890	1890	-209
<b>Wildlife</b>						
Mule deer — Mortality 1	40	45	45	55	55	38
Long term displacement	380	245	150	875	875	450
Acres of habitat degraded	1000	4934	1825	9050	9050	735
Acres habitat improve (000s)	13	13	13	14	13	14
Antelope — Mortality 1	65	60	60	50	50	67
Long term displacement	65	14	25	95	95	80
Acres of habitat degraded	540	1487	890	2890	2890	390
Acres habitat improved (000)	11.7	11.7	11.7	12.7	11.7	12.7
Elk — Mortality 1	5	0	0	5	10	6
Long term displacement	20	0	0	15	30	25
Acres habitat degraded	95	190	190	280	475	70
Acres habitat improved	300	300	300	325	300	325
Moose — Mortality 1	40	5	5	30	35	42
Long term displacement	10	40	40	65	70	8
Acres habitat degraded	1550	3000	3000	4750	5250	1300
Acres habitat improved	500	500	500	500	500	500
Raptors — Animals displaced	10	20	13	30	30	8
Protected from displacement	30	20	27	15	10	35
Sage Grouse — Habitat degraded	70	150	150	230	450	50
Habitat improved/protected	2800	2800	2800	2900	2500	2900
Fish — % population lost	10%	18%	18%	25%	30%	9%
% Habitat degraded	10%	20%	20%	28%	30%	9%
% Habitat improved/protected	15%	15%	15%	15%	15%	15%
<b>LIVESTOCK GRAZING MANAGEMENT</b>						
Short term AUM loss	290	352	683	1024	1024	228
Long term AUM loss (10 year)	234	296	124	186	186	41
<b>VEGETATION</b>						
Acres disturbed short-term	4209	5109	5109	6009	6009	3099
Acres disturbed long-term	3399	4299	4299	5199	5199	3099



## ENVIRONMENTAL CONSEQUENCES

### ALTERNATIVE SUMMARY COMPARISON TABLE (Continued)

ITEMS	A	B	C	D	E	F
<b>RECREATION</b>						
Total user days	1500	1250	1250	800	800	1700
ORV user days	500	500	500	500	500	500
<b>TRANSPORTATION</b>						
Percent reduction roads	15%	15%	15%	15%	15%	?
<b>VISUAL RESOURCE MANAGEMENT</b>						
/- Class II (in 000's acres)		-1	-1	-1.6	-1.6	NA
/- Class III (000's acres)				-.03	-.03	NA
<b>SALABLE MINERALS</b>						
Total gravel pits	6	12	12	15	15	6
Total acres	110	230	230	290	290	110
<b>SOILS</b>						
Rate of loss — tons/acre/year	5.5	9.4	9.4	12.7	12.7	3.0
Total loss — tons/year (000s)	13.3	23.8	23.8	34.3	34.3	6.9
<b>AIR QUALITY (cumulative)</b>						
TSP (in 000 tons/year)	13.7	14.9	14.9	16.9	16.9	13.2
SO <sub>2</sub> (in 000 tons/year)	12.4	13.4	13.4	15.3	15.3	11.8
NO <sub>x</sub> (in 000 tons/year)	186	202	202	230	230	178
<b>WATERSHED</b>						
Sediment load increase (tons/year)	663	1188	1188	1713	1713	348
Salt added (tons/year)	0.6	1.1	1.1	1.5	1.5	0.3
<b>FORESTRY</b>						
Acres to be harvested	70	70	70	70	70	70

<sup>1</sup> Estimate of total deaths (regardless of cause (e.g. hunting, collision), for the analysis period.)

## GENERAL SOCIOECONOMIC ASSUMPTIONS

There are certain assumptions relative to the socioeconomic analyses in this report that will be applied to all the alternatives. They are as follows:

1. It takes an average of about 20 days to drill a gas well in the CAP area and another 30 days to complete it.
2. There is normally at least one completion rig working in the oil/gas field for every drilling rig operating there, but assuming 30 days to complete a well would mean that in periods of limited drilling time there would need to be three completion rigs for every two drilling rigs.
3. The average number of workers on a drilling rig totals 20 and the average number of workers on a completion rig totals 5.
4. Eight to 12 drilling rigs are normally operating in the CAP area during the drilling season, and about 8 rigs were operating during the 1989 season when 54 wells were drilled.
5. A total of about 300-350 people are involved in all of the well drilling and completion operations in the CAP area in a typical drilling season. Assuming 8 drilling and 8 completion rigs on average in the CAP during a normal season, about 200 of these are rig workers. Of the 200, about 50% are estimated to be local residents.
6. The average work week is about 48 hours (the range is 42, 48, and 60).
7. The average wage per hour for drilling and completion rig workers is \$10.75 (the range is \$9.00-\$12.50).
8. The average wage per hour for workers providing services to the oil/gas field activities is about \$9.50 (the range is \$8.50-\$10.50).



## ENVIRONMENTAL CONSEQUENCES

9. The average cost to drill and complete each well is \$750,000, not counting labor. About 90% of this total flows into the economies of the four-county area, and about 45% (approximately \$340,000) flows into the economy of Sublette County with the majority of this going to the communities bordering the CAP area.
10. In addition to the drilling/completion expenses, there are about \$2.3 million annually of other expenses incurred by the oil/gas companies and their employees that flow into the four-county area. About \$1.4 million of this would be spent in Sublette County and the CAP communities.
11. Currently, at least 50% of rig workers are nonresidents who live in temporary housing in the local CAP area during the drilling season. Such housing is filled to capacity in the drilling season and largely empty during the off-season. Some drilling contractors report that they provide housing for their nonresident workers, but it is not known how many workers this involves. Therefore, this report assumes workers spend money in the local area to acquire housing. Less than 50% of the nonresident workers are reported to be married and most of these do not bring families with them to the local area.
12. Currently, a large number (about 30%) of oil/gas service industry employees are also nonresidents living in temporary housing during the drilling season.
13. Skilled oil/gas field labor is scarce, making it difficult to obtain and retain in any given area during slack periods.
14. Area communities are 75-90% dependent upon the oil/gas activities in the CAP area.
15. Percentages expended out of each dollar of income for various items: (per Wyoming Labor Force Trends, Vol. 27, No. 7, July 1990): housing=22%, groceries=17%, transportation=13%, utilities=11%, health care=7%, and miscellaneous=30%. It is estimated that rig workers who are local residents spend about 80% of their income in the local area compared to 50% for nonresidents.
16. The oil/gas companies will plug and reclaim 200 old wells over the 10-year period at an average cost of \$25,000/well (\$20,000 to plug and \$5,000 to reclaim). Most of the reclamation work would be completed by local contractors.

The following table depicts the number of days available for drilling under various scenarios, and the corresponding number of drilling and completion rigs needed in each case.

### DRILLING PERIODS: NUMBER OF WELLS/RIG/YEAR

Drilling Period Date	Restricted Period Days	No. of Wells/Rig Date	Days	Drilling	Compl.
8/1 to 11/15	107	11/15 to 8/1	258	5	4
8/1 to 12/15	137	12/15 to 8/1	228	7	5
5/1 to 11/15	199	11/15 to 5/1	166	10	7
4/1 to 11/15	229	11/15 to 4/1	136	11	8
3/15 to 11/15	244	11/15 to 3/15	121	12	8
4/16 to 12/15	244	12/15 to 4/16	121	12	8
3/1 to 1/1	305	1/1 to 3/1	60	15	10
1/1 to 12/31	365	None	0	18	12

The direct costs to an oil/gas company to drill and complete a well (exclusive of surface equipment costs) is reported to be between \$700,000 and \$800,000, of which about 87-88% are intangible type

costs. Intangible costs involve such items as fuel, water, cement and cement services, tools, bits, etc. Tangibles would include such items as well and lease equipment.



### I. ALTERNATIVE A - CAP Based on Implementation of Pinedale RMP Decisions

Alternative A implements the current management decisions specified in the Pinedale RMP as they apply to the CAP area. This alternative provides for 300 new wells to be drilled in the CAP area over the next 10 years. This assumes that development will be allowed to continue to the extent necessary to efficiently develop the area. Fifty (50) wells would be drilled the first year. The remaining 250 wells would be drilled at the rate of about 28 per year over the next 9 years. Two hundred (200) wells would also be reclaimed over those 10 years. For more information, refer to Chapter II, Alternative A.

#### A. Socioeconomic

This alternative potentially restricts activities and surface use (including drilling operations) from November 15 through July 31 to protect big game winter range and various game and nongame birds' wintering and breeding grounds and nesting areas. Although the alternative states that these restrictions can have exceptions under certain circumstances, it is not possible to estimate how many exceptions would be requested or given. Appendix J compares socioeconomic impacts of the various scenarios and alternatives as it relates to oil and gas.

Therefore, the following three scenarios are considered for this alternative to show potential impacts for various drilling season timeframes:

1. The entire CAP area would be subject to the November through July restrictions and drilling would be suspended for 258 days each year.
2. Drilling in the entire area is restricted from November 15 through April 30 (166 days) to protect crucial winter range and areas of concentration for deer, antelope, and some birds. Exceptions and mitigation measures are likely to be applied as needed during the February to July 31 restriction period for game birds and raptors making restrictions in this period infrequent.
3. Exceptions and mitigation measures are possible throughout the entire November through July restriction period, allowing drilling to proceed as long as the well being of wildlife is not adversely impacted. This scenario resembles past activities with regard to seasonal restrictions.

Scenario 1 is a virtually impossible scenario because it assumes all 300 wells in the CAP area would have nesting birds in the immediate vicinity

of the proposed well pads and, subsequently, be subject to seasonal nesting restrictions. Historically, less than 5% of all permitted wells have actually been delayed due to nesting birds.

Scenario 2 is the closest to what actually would be expected to occur in the CAP area under this alternative. However, it assumes that the entire CAP area and the 300 wells would be subject to the crucial deer winter range drilling restrictions. In fact, not more than 70% of the CAP area is regarded as crucial deer and antelope winter range subject to winter drilling restrictions. Therefore, wells could be drilled in 30% of the CAP area year-round.

Scenario 3 is overly optimistic. While exceptions to various restrictions could be granted under applicable conditions, these exceptions are not assured. Therefore, all work should be scheduled for completion prior to November 15.

**Scenario 1** - This scenario assumes that this alternative leaves 107 days per year that are not restricted for drilling activities. With these assumptions, one drilling rig could only drill about five wells and a completion rig complete about three wells per year.

Fifty wells the first year - To drill 50 wells in the CAP the first year would require about 10 drilling and 15 completion rigs to be working full-time during the 107 days. About 275 rig workers would be required to man these 25 rigs. Since the local labor pool for skilled rig workers is exhausted before reaching an eight rig total, the added workers are assumed to be nonresidents. This means additional pressure to provide temporary housing and a longer period (258 days) of vacant temporary housing once the 107-day drilling season has ended. It also means that consumer spending by rig workers would rise during the 107 days then fall to nonseasonal levels much sooner in the year than would normally occur.

Therefore, any income gained by local businesses from the added activity in the 107-day drilling season probably would be neutralized by the reductions in rents, consumer spending, and sales taxes during the rest of the year. Also, since 175 rig workers are assumed to be nonresidents, a large segment of their income could leave the local area for their home areas. This would be particularly true for the married nonresidents.

Twenty-eight wells per season for 9 years - Assuming a potential of 5 wells per drilling rig in the 107-day period, it would take 6 drilling rigs and nine completion rigs working full time during the season to drill 28 wells. This would require about 165 rig workers. It is assumed that about 65 of these rig workers are nonresidents, and less of the nonresident income will be going into the economy of the local area.



## ENVIRONMENTAL CONSEQUENCES

Over 10 years, direct income to the local area as the result of oil/gas well drilling and completion activities would total about \$125.9 million.

Over the 10 years, 200 old wells will be reclaimed and plugged. This would total about \$5 million in reclamation and plugging costs. Since this work would probably be done by local service people, most of the \$5 million would enter the local area economy. Therefore, the total direct expenditures to the local area over the 10 years would be roughly \$137 million.

**Scenario 2** - This scenario assumes that drilling in the CAP area is restricted from November 15 through April 30 (166 days) leaving 199 days for the drilling season.

Fifty wells the first year - Assuming that 1 rig could drill 10 wells and a completion rig could complete 6 wells per 199-day season, it would require 5 drilling and 8 completion rigs working full-time to complete 50 wells in 199 days. This would require a total of about 140 rig workers, down about 30% from the total rig workers estimated for the area in 1989. This would have the effect of decreasing the pressure on temporary housing during the drilling season below levels experienced in 1989, and below levels assumed for the 107-day drilling season.

However, the 199-day drilling season extends the time that workers stay in the local area in any given year. This adds to the time period in which the local area receives rents, consumer spending, and sales taxes from nonresidents.

Twenty-eight wells per season for 9 years - Assuming 28 wells drilled in 199 days would require about 3 drilling rigs and about 5 completion rigs operating full-time during the season. This would require about 85 rig workers (less than 1/2 the number estimated for 1989). All workers are estimated to be residents of the local area and the need for temporary housing by rig workers would be negligible.

The total direct income to the local area over 10 years would be about \$127.2 million from oil/gas drilling activities. Added to this is the \$5 million in expenditures to local service industries that would result from reclaiming the 200 old well sites, making the total about \$132 million.

**Scenario 3** - This scenario assumes that exceptions and mitigation measures are possible throughout the entire November through July restriction period as long as the well being of wildlife is not adversely impacted. In effect, this increases the drilling time to about 305 days, if it is assumed that drilling is only hampered by the severe weather of January and February.

Drilling 50 wells the first year - Assuming that 1 rig can drill 15 wells per season in this 305 day season, it would take 4 drilling rigs and 6 completion rigs to drill 50 wells. This requires about 110 rig workers per season, down about 45% from estimates of rig workers in 1989.

Since at least 100 workers could be residents of the local area, it would result in a more stable community because more of the income earned by these resident workers would stay within the local area. However, those who have temporary housing to rent would not benefit from a 305-day season at the 50-well level, because nonresident demand for temporary housing would be down substantially.

Temporary housing for employees working for businesses providing oil/gas field services could also see a decline. The longer season could encourage nonresident service industry employees to become permanent residents. The number of employees working for industries servicing the oil/gas fields in a 305-day season in which only 50 wells were drilled might also be lower than in the other two scenarios of this alternative. These businesses might have more time to provide services to each well, subsequently enabling them to operate with a smaller workforce.

Twenty-eight wells per drilling season for 9 years - Assuming that 1 rig can drill 15 wells per season in a 305-day season, 2 drilling rigs, 3 completion rigs, and a total of 55 workers could drill 28 wells in 305 days.

This is about 1/4 as many rig workers as estimated for 1989. It is assumed that all of these workers were local residents who spend their money in the local area. It is not known how this level of drilling activity would affect employment in the businesses providing services to the oil/gas field. Because of the time available from slack periods, declines in total employees working for these businesses could result in an over all loss of income to the local area.

This scenario would result in direct income to the local area over 10 years of approximately \$127.3 million from oil/gas drilling activities. Reclaiming 200 wells over the 10 years would add \$5 million more to local income for a total of between \$132 and \$133 million.

The socioeconomic analysis for resources other than oil and gas are included in each alternative within the specific resource sections.

## B. Oil and Gas

In the alternative discussions, the word "industry" is used in the context of meaning any company who works in the Big Piney-LaBarge Field.



## ENVIRONMENTAL CONSEQUENCES

### Assumptions

Three hundred wells will be drilled over the next 10 years. For this analysis, it is assumed that 50 wells will be drilled the first year, and approximately 28 drilled for each of the remaining 9 years. Operators, over the 10-year period, will complete abandonment procedures, properly plug wells, and reclaim the surface for 200 wells that have no potential for future use. Approximately 110 miles of existing road will be closed and reclaimed.

If 50 wells are drilled and completed for production in the first year or some high development year, it would add an additional 50-175 mmcf gas production per day to the existing quantity. In Wyoming, the average volume of natural gas required to heat one home for 6 months in the winter season is 90 mcf (Cheyenne Light, Fuel, and Power Company). This means 1 day's production from 50 new wells would heat from 555-1,944 homes for 6 months, or one winter season. Each additional 28 wells, added annually, to the system would provide enough energy from 1 day's production to heat 311-1,089 homes for one 6-month winter season. Cumulatively, the daily production from 300 wells would add the energy to heat from 3,333-11,667 homes for a winter season. Multiplying by 182 days for a 6-month winter, 300 wells would provide enough energy to keep 608,272 to 2,129,227 families warm for one winter. Not all of the gas would be used for household purposes, but it would also be available for municipal and industrial needs. Any year with a harsh winter could result in regional gas shortages, increased production demands, and increases in commodity costs to the using public.

### Impacts

Seasonal restrictions and surface disturbance constraints could also create adverse impacts to the oil and gas industry in the following ways: (1) demands on the oil and gas companies to plan ahead, (2) inability to react quickly to market changes, (3) delays, and (4) in rare cases, lost reserves.

Constraints to oil and gas exploration and development could create adverse impacts in the areas of supply and demand and the efficient development of oil and gas reserves. It could create adverse impacts to the local community through availability of jobs and fluctuations in capitol (see section on socioeconomic).

The constraints can be manifested as limitations applied to construction or limitations resulting from conflict with cultural, visual, wildlife, or watershed/riparian resources. These constraints can range from seasonal restrictions, where the company only has a certain number of days to drill, to no surface

occupancy, where the company must directionally drill into the area, or the company is not able to drill at all. If a development well cannot be drilled due to a constraint, the company loses production and revenue while public users lose a potential energy resource.

The seasonal restrictions that will be used on 70% of the planning area will leave 199 days for drilling and completing a well in the restricted areas. The effect of these restrictions is that they put the companies in a position where they must have a well-planned drilling program if they wish to complete their drilling in this time period or continue to drill year-round with no delays. This creates a small impact if a company has long-range plans to develop an area but can make it difficult for a company to react quickly to the sudden changes in market conditions inherent in the oil and gas industry. While exceptions to the seasonal restriction are possible, and have even been common in recent years, they are dependent on uncontrollable factors such as weather, animal distribution, and snow cover. However, oil companies cannot always plan on receiving exceptions. This results in the 199-day drilling season for 70% of the area. The shortened season for drilling wells should allow for enough time to efficiently drill the number of wells analyzed in this alternative.

When both the big game seasonal restriction (November 15 to April 30) and the raptor/sage grouse seasonal restriction (February 1 to July 31) apply to a drilling location, it results in a worst case scenario where there would only be 107 days (August, September, October, and November 1-14) available for drilling and completion activities. This can be expected in approximately 5% of the planning area. If an application for permit to drill (APD) is submitted during the drilling window, an additional required 30-day public notification period, before approval can be granted, must be added to the time limitations imposed for drilling and completing a well. Presently 34-50 days are needed to drill and complete a gas well. If a company plans to drill 50 wells in a given year, and the wells are located in a worst case scenario area with no APD processing delays, the company would only be able to drill and complete wells, at 34 days per well, or they would have to have 17 rigs running at the same time to complete a 50-well drilling program. A company with a 50-well annual program, broken down into the two phases of drilling and completion, located in the worst case scenario area and without application processing delays, would only be able to drill 5 ( $5 \times 20 = 100$  days) wells in 107 days with 1 rig. They would only be completing 3 of the 5 drilled wells with 1 completion rig. To drill 50 wells in 107 days, the company would need 10 rigs. To complete these 50 wells in the 107 days, the company would need 15 completion rigs.



## ENVIRONMENTAL CONSEQUENCES

Other surface restrictions resulting from conflicts with cultural, visual, and watershed/riparian resources can also cause a delay in permitting and drilling a well. These delays can, for the most part, be averted with thorough planning but can make it difficult for a company to act quickly in some cases. Also, some delays, such as when a cultural site must be evaluated, cannot be avoided. In rare cases, a well may need to be drilled directionally due to surface conflicts. This would increase the cost of the well, and the increased cost may be enough of a deterrent to the oil and gas company that the well would not be drilled at all. In a case like this, oil and gas will be left in the ground resulting in a short-term loss of reserves. In cases of delayed drilling, income would be delayed for the company and royalties would be delayed for the State of Wyoming and the Federal Government. In the case of a well not being drilled, a potential source of income to the company, State, and the Federal Government would be lost.

The next impact to the company would be finding enough rigs to drill and complete 50 wells in 107 days. Eight rigs operated in the area during the 1989 season. Eight to 12 rigs normally operate in the area during the drilling season. Rig availability is dependent upon many factors with one uncontrolled factor being regional activity.

Another impact to the oil and gas industry is the reclamation procedures. Much of the vegetation for the CAP area is in a decadent condition. The oil and gas development in the area has been blamed for this condition, although there has been an overabundance of mule deer and some overgrazing by livestock. The oil and gas industry does disturb recreation, but most of the acres involved are not permanently lost to vegetation and forage production, they will eventually all be reclaimed.

Companies complete the required reclamation work, as prescribed by BLM, but the revegetation has not been successful. Seed mixtures and planting policies need to be evaluated and revised to provide a program that can be expected to have a higher rate of success. When a company has to reseed or rework a reclaimed area, it is an economic loss. It may be necessary and cost efficient to require the reclaimed area to be fenced where cattle and wildlife grazing can be expected. A viable reclamation plan would be cost effective for the company and beneficial to vegetation success.

Since most new wells will be development gas wells, the area of long-term disturbance, including access roads, is calculated at 3 acres per well. This means the long-term surface disturbance for the first year would equal 150 acres with an additional 84 acres added each year for the next 9 years. For the 10-year period projected this would total 900 acres for 300 wells or 0.46% of the CAP area.

The amount of area reclaimed for the 10-year period may not be equivalent to the area disturbed. There will be 200 wells plugged, abandoned, and the surface reclaimed within the 10-year period. There will also be 110 miles of existing road reclaimed. Calculations (Appendix E) show this would result in a total loss of surface vegetation of 90 acres or 0.046% of the CAP area. These calculations are based on recent BLM data for plugging and abandoning wells which indicates that an average of 3 surface acres are disturbed for each new well.

This may not be the case for many of the older wells which were developed prior to current planning standards, and may encompass more than 3 acres of surface disturbance. Vegetative reproduction on reclaimed sites may be greater than the production lost to new wells.

Constraints on vehicle travel could adversely impact oil and gas operations if road closures were implemented without the consultation and cooperation of the oil and gas industry. Road closures should not be imposed if they would deny access to production facilities. However, there are no provisions in the current leasing documents that would prevent an operator from having access to a producing well in this field, and the intention of the proposed plan was not to close roads for field operations where they are needed.

Efficient development of oil and gas reserves will be adversely impacted by seasonal restrictions and surface disturbance constraints. The adverse impacts will not only affect the drilling aspects of the oil and gas industry, but also the production and transportation phases.

Over the past 2 years, 21 of the 22 requests received by BLM to continue drilling between November 15 and April 30 were approved. Between the years of 1920 and 1989, 80% of the wells drilled were drilled between April and November. Due to the conditions of the winters and the level of drilling activity, the seasonal constraints have not had much impact upon the efficient development of oil and gas. If the historical drilling trends continue, impacts to the oil and gas industry should be based upon local and national demands for the products. Large scale increases in demand, however, could require year-round development activities to efficiently drill and produce the area.

### Cumulative Impacts

The cumulative impacts to minerals are related to two things. First is the balance that must be achieved between all available resources in the study area. Second is the demand for the nation's oil and gas resources. This holds true for all the alternatives in this assessment.



## ENVIRONMENTAL CONSEQUENCES

In Alternative A, the protection of all resources is considered equally important. Oil and gas development is allowed to proceed at a slightly enhanced rate over the number of wells lost to production for the 10 years. The number of wells drilled (300) will exceed the number of wells plugged and abandoned (200) by a total of 100 wells. Many of the reclaimed wells will be older oil wells while the new wells will be mostly gas wells but, given the overall decline in production, this will provide a net increase of energy available.

Alternative A will result in approximately 300 more producing wells and a more efficient drainage of the oil and gas reserves in the area. This will help to meet the nations demand for energy and increase royalty income to the State and Federal Government.

The consequences of drilling or not drilling development wells in the CAP area go far beyond total surface area disturbed or potential wildlife displaced. Its impacts affect the nation's ability to utilize its energy reserves . . . energy that fuels the economy by supplying the needs of families, towns, cities, and various industries. The impacts on the human environment extend beyond the boundaries of the CAP, are quite beneficial, and the benefits increase with the increase in production for the area and decrease with a decrease in production.

It can be hypothesized that, if the drilling period were extended for an additional 2-4 months, the expenditures of the oil/gas companies and their employees in Sublette County and the local CAP communities could increase by from \$275,000 to \$425,000 annually. Of course, if expanding the drilling/completion period resulted in a more stable community with more rig and service workers living permanently in the local area, then the employee related portion of these expenditures could increase even more. Any increase or decreases in oil/gas activities and related spending also affect local, county, State, and Federal revenues as the result of changes in taxes and royalties paid to them. There is an impact on the local revenues between summer and winter, but it is not clear just how much revenues could increase by extending the drilling season. It would depend greatly on whether the companies simply drilled the same number of wells over the longer time period or whether they drilled additional wells. If the same number of wells were drilled, then the only increase in local revenues would come from some added consumer spending by workers who were encouraged to remain longer in the CAP area. Taxes are reported on a State and county level and not on the local level needed for estimating local impacts.

The current world market conditions for oil have placed a new emphasis on the need to develop national hydrocarbon reserves. A 100-well increase, over a 10-year period, may not be sufficient to meet market needs.

### Mitigation

Mitigation measures for oil and gas under Alternative A would include the improved reclamation plan for the area which, along with vegetative treatments, would improve the vegetation substantially, mitigation of the seasonal restrictions to allow more drilling days, and mitigation of surface disturbance constraints. The mitigation of the number of wells (300) that Alternative A allows may need to be lessened or increased depending on economics.

### Residual Impacts

Analysis has not indicated any residual impacts.

## C. Wildlife Habitat

### Assumptions

Because it is extremely difficult to assess the impacts of nearly a century of past human activities on the native wildlife populations of this area, the present wildlife populations and habitat conditions are used in this document as a benchmark, or baseline, from which to predict environmental impacts. This approach, however, should in no way diminish the importance of past activities in this area on the welfare of the wildlife resource. The analysis of impacts herein are confined to only those priority management species occurring in the CAP area.

**Mule Deer** - A number of the proposed mineral development activities in the CAP area could result in impacts to the mule deer populations. Direct impacts (i.e., impacts to the animals themselves) are associated with poaching, accidents, hunting, and displacement.

As the human population of an area increases, the incidence of game violations increase. Over the next 10-year period, the human population in the CAP area is expected to decrease about 1.5% from the 1989 levels depicted in Alternative A. This decrease is expected to lead to a commensurate minor decrease in game violations from the existing levels.

A number of factors affect the accidental mortality rate of big game, however, and the mortality rate is not necessarily directly proportional to the volume of vehicle traffic. Thirteen years of mule deer road kill data from the Big Piney-LaBarge area collected by the WGFD were used to estimate roughly three less mule deer deaths per year in this alternative as a result of accidents. The decreased incidence of accidents could also be viewed as a human safety benefit.



## ENVIRONMENTAL CONSEQUENCES

Legal hunting pressure in the area is likely to increase, but this can be either a beneficial or adverse impact. Increased hunting pressure can tax the enforcement capabilities of the WGFD, but it can also help relieve overpopulation problems in the game herds. Overpopulation is adversely affecting the condition of the winter range in the CAP area. The WGFD has designed a mule deer hunting strategy which will hopefully result in a projected increase in hunting pressure and harvest of 36% (or about 880 deer) per year. Without this increased harvest, the habitat will be over utilized to the point of not supporting the objective, let alone the current population. Thus, the proposed increase in harvest, while appearing to be detrimental in terms of animals removed from the population, actually is a positive impact to the overall, long-term health of the herd.

A direct impact to mule deer is the displacement of animals due to human disturbance (e.g., vehicular traffic). These displacements can lead to physiological and behavioral abnormalities, which could result in stress related mortalities. Animal condition in late fall is a primary factor to winter survival as animals with adequate fat reserves are most likely to survive the winter. Some winter mortality can be expected under the best of circumstances, but added stress from human activity can cause mortality above what would be considered normal, especially during a severe winter. Displacement can force animals into areas that may not be optimal for their survival, making them more susceptible to predation, diseases fostered by crowding and greater energy depletion. Displacement also can result in short-term aggregation leading to habitat overuse and damage.

Displacement is a disruption of an animal's "normal" behavioral patterns resulting in movement off/away from their regularly occupied habitat or pattern of use (e.g., a flight or avoidance reaction to or from some disturbance or other factor). In the context of this impact analysis, the disturbance results in an undesirable effect on individual animals or populations. Wildlife displacement resulting from human disturbance can take two basic forms; short-term and long-term.

Most animals, deer included, are reluctant to permanently abandon their home range and familiar areas. Mule deer observation data collected during the development of Birch Creek well No. 110 verifies the temporary displacement of mule deer from drilling activities. For the purposes of this analysis, 4% of crucial winter range is involved in roads or well pads.

Assuming that each well is accessed daily for 1-2 hours for maintenance purposes, displacement of deer could occur when deer are browsing within ¼

mile or closer to the well head. Deer become habituated to vehicle traffic and well venting in the early winter. However, when a person steps out to service a well, the deer are likely to temporarily leave the area until the vehicle has left. Major maintenance work which requires a crew and workover rig are more disturbing to the deer due to the added length of time involved in performing these type of operations. However, for purposes of this analysis, no more than 5% of the deer objective population in the CAP area (426 animals) are expected to be displaced due to maintenance operations and, even then, the animals will generally return to their normal distribution within 2-3 hours of moving. This is not deemed significant during normal years. However, during severe winters, this becomes a different situation since the deer tend to congregate on snowplowed roads, thus becoming more prone to displacement and/or mortality associated with vehicle accidents.

Off-road vehicles (ORVs) and other vehicular use (nonmineral related) in the CAP area has the potential to cause temporary (short-term) displacement of 300 or more wintering mule deer. Use restrictions placed on ORVs and other vehicle use (nonmineral related) in the CAP area is expected to prevent the annual displacement of 200 or more wintering mule deer per year that would otherwise have been displaced by these activities.

Long-term mule deer displacement can result from intensive human activity lasting over an extended period. The noise and human movements associated with well pad and road construction, drilling activities, and vehicular traffic can cause deer to leave an area for several weeks or months or, in extreme cases, abandon the area permanently. This long-term displacement can cause a concentration or stacking of deer in the habitat the animals were displaced to, resulting in habitat damage and reduced carrying capacity of that habitat. Over a long period of time, the animal population will eventually adjust to the lower habitat carrying capacity, resulting in a reduced population level.

The standard surface stipulations applied to public lands in this alternative prevent most long-term displacement of wildlife caused by mineral development activities during the severe winter periods, when habitat is deemed most limiting. Regardless, some long-term displacement will result from well drilling activities on State and private lands. These activities are estimated to result in the displacement of approximately 110 deer per year from the crucial range in this alternative.

For the analysis of this alternative, it would help maintain productivity of forage on 290 deer that would have been displaced by human activity will be left undisturbed each year as a result of the proposed protective stipulations.



## ENVIRONMENTAL CONSEQUENCES

Without the winter use restrictions, it is estimated that roughly 2% of the crucial deer winter range (or 2,360 acres).

Indirect impacts are those activities which affect an animal's habitat and, thereby, could eventually affect the animals overall well-being. Surface disturbance activities in the oil and gas fields resulting from excavation of drill pads, roads, and other ancillary facilities typically degrade or eliminate habitat at a development location. In this alternative, it was estimated that roughly 110 acres of mule deer habitat in the CAP area would be disturbed as a result of these activities annually.

Part of the direct habitat acreage lost to surface disturbance would be offset by reclamation of locations and roads (estimated at around 700 acres) during the same period. However, this recovery would not likely be realized until after 10-20 years due to the length of time required to establish a viable shrub stand. The value of reclaimed habitat, however, depends on the type of reclamation and its success. Some of the old and recent reclamation in this area is of only marginal value to mule deer.

Probably the most subtle, yet meaningful, adverse indirect impact to mule deer in any alternative comes from the additional habitat degradation resulting from displaced animals "stacking" into crucial winter ranges in the CAP area, which are already in poor condition. To fully understand the importance of this impact, it is necessary to reemphasize several points:

1. Habitat is not currently available to support WGFD population objective numbers over the long-term due to poor vegetation conditions.
2. Over populations of deer will not be controlled until after 5 years of hunting and/or a severe winter brings the deer population to below objective numbers resulting from a die-off.
3. Range improvements, if given adequate protection from browsing, will take 10-15 years to reach production of forage (sagebrush) at current levels.
4. About 10% of the crucial range will be treated over the next 20 years, or about 5% in 10 years.

The bottom line is that adequate habitat on crucial winter ranges in the CAP area does not currently exist to support mule deer populations at present objective levels, and displaced animals "stack" into these ranges and compound the problems. This problem is even further aggravated by the overlapping use of vegetation by deer, antelope, and cattle in the CAP area. Development on non-BLM lands in this alternative is expected to cause habitat degradation from overuse on about 900 acres of crucial winter range per year.

Domestic livestock management actions will have some indirect impacts on mule deer by altering the quality and quantity of available habitat. For this analysis, it was estimated that implementation of better livestock grazing systems over the next 10 years would provide more forage on deer habitat on an estimated 13,000 acres annually in the CAP area. However, the habitat will likely remain in poor condition due to the existing intensive use by deer unless populations are reduced by severe winters during this period.

Some vegetation manipulations, in the form of prescribed burns, brush chaining and roto-beating, and chemical spraying are also expected to improve approximately 15,000 acres of mule deer habitat in the CAP area. This equates to improved habitat in mule deer ranges at the rate of about 1,500 acres per year, realized to fruition in 10-20 years.

Several new water developments (e.g., reservoirs, pipelines, etc.) are proposed in this alternative with the intent to create better livestock distribution and better range use. Creation of new livestock waters can be either beneficial or detrimental. These facilities can create new drinking sources for wildlife, thereby opening up unused areas and improving the utility of existing habitat. Wildlife do not generally need additional water on winter range in this area. They will, however, use open free-flowing water when available. Most livestock water developments are not free-flowing and, therefore, would not benefit wintering wildlife populations. Water developments can encourage increased livestock use of some areas resulting in increased wildlife/livestock competition for forage. There is also a very minor amount of habitat lost to surface disturbance when these facilities are built. In this alternative, it was estimated that, over 10 years, nearly 20,000 acres (average 2,000 acres per year) of rangeland habitat would be made more available for livestock use by the proposed new water developments, which will benefit deer by relieving livestock grazing pressure on over-used desert saltbush and winterfat communities. However, the impact is adverse when livestock water developments are placed in salt desert sites that produce only minor amounts of grass, thus creating a conflict for forage (winterfat and saltbush) between cattle and deer.

Fences can facilitate better domestic livestock distribution and management and result in better habitat conditions. It is estimated that the fence projects proposed in this alternative could lead to the improved range condition of 60,000 acres or more mule deer habitat over the next 10 years (average of 6,000 acres per year) by improving livestock control and distribution. But, fences can also be a hazard to wildlife by impeding necessary migrational movements and daily travels, and by entangling animals. Some of the proposed management fences in this alternative (particularly the Saddle Ridge fence



## ENVIRONMENTAL CONSEQUENCES

and the Chevron Drift fence) could be potential hazards to wildlife. Range fences can be built to specifications that create easier negotiation by deer; however, mitigation proposed in this alternative (gates and let-down panels in mitigation areas) should help alleviate these impacts.

Voluntary compensation efforts in the CAP area could improve existing habitat, or create new habitat, to offset habitat lost to surface disturbances. If this occurs, most of this work would likely come in the form of vegetation manipulation and water developments.

**Antelope** - The nature of the impacts on antelope are the same as those for mule deer; only the magnitude is different. The discussion in the mule deer section pertaining to habitat improvements, livestock, fences, and oil and gas development also applies to pronghorns.

Antelope deaths resulting from poaching activities are expected to decrease slightly (estimated at one animal per year) in the CAP area in this alternative. The accident rate is also expected to decrease slightly (estimated at one animal per year). The WGFD wants to decrease the existing antelope population in the area, so hunting pressure is expected to increase in the short-term, but drop off as the populations resettle around the long-term herd objective levels.

Surface protection stipulations are expected to prevent any long-term antelope displacement from crucial winter range on public lands in this alternative, but some long-term displacement (estimated at 16 animals per year) would likely still occur from State and private lands resulting from mineral development activities. Short-term displacement of approximately 155 antelope per year would still occur as a result of oil and gas field maintenance activities and other human land uses. The use of surface protective stipulations on public lands is expected to prevent the displacement of roughly 80 antelope that might have otherwise been displaced from public lands had the stipulations not been used.

Roughly 100 acres of antelope habitat per year are expected to be lost directly to surface disturbances in the CAP area. Over a 10-year period, about 630 acres of antelope habitat will be reclaimed, but this reclamation is unlikely to reach full functional effectiveness for at least 15-20 years. An estimated 440 acres per year of antelope crucial winter range is expected to experience degraded habitat quality and carrying capacity as a result of displacement "stacking" from private and State land mineral development activities.

Improved grazing systems are expected to enhance the quality of roughly 11,700 acres of antelope habitat per year, and approximately 1,350 acres of antelope habitat will be enhanced by vegetation treatments during the same period if control of animal numbers can be obtained. Most of the antelope crucial winter range overlaps the mule deer crucial winter range. Therefore, improvements designed for mule deer habitat enhancement will also enhance pronghorn habitat. It will take 15-20 years to realize the full effectiveness of these vegetation manipulations. Water developments could enhance roughly 1,800 acres of antelope habitat per year. Proposed fences are expected to improve an average of roughly 5,400 acres of antelope habitat per year through improved livestock distribution and the resulting better range condition. Antelope can be detrimentally affected by fences; however, application of the standardized antelope range fence specifications should minimize any animal losses.

Voluntary compensation efforts could improve or create antelope habitat. Most of this work would come in the form of vegetation manipulation and water developments.

**Elk** - The nature of the impacts for elk are the same as for mule deer; only the amount of the impact is different.

Elk deaths resulting from poaching and accidents (respectively) are expected to decrease from current levels only slightly in this alternative (estimated at one animal per year). Based on WGFD projections, hunting pressure will decline resulting in fewer elk killed in this alternative over the long run.

Crucial elk winter range areas are protected by the winter range stipulation and have received little opposition from industry, as elk are prone to avoid areas of human activity in a natural setting. While the winter range stipulation is applied to elk range, the potential for conflict with oil and gas operations still exist from routine maintenance activities. Most of the well sites in crucial elk range are Mobil Oil Company sites and are controlled remotely, minimizing surface activities. The elk winter range contains numerous roads and well facilities. In spite of this situation, elk have continued to use these areas to some degree, although probably in fewer numbers than if there was no vehicle traffic. While much of the elk habitat in the CAP area is inaccessible to traditional human activities during the time when elk would normally occupy it, there could still be some adverse impact to elk resulting from ORV use (particularly snowmobile) and other vehicle access.

Due to the application of surface protection stipulations, long-term displacement of elk from public



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lands is not expected in this alternative. It is expected that a few elk (estimated at 2/year) will be displaced long-term from State and private lands in the CAP area. It is anticipated that approximately 15 elk per year will be displaced short-term by oil and gas maintenance activities and other nonmineral actions.

The surface protection stipulations applied to human activities on public lands will probably prevent the long-term displacement of roughly 20 elk per year that would likely have been moved without the use of the stipulations.

The surface would be directly disturbed on approximately 10 acres of crucial elk winter range per year in this alternative, and habitat would be degraded on about 85 acres of crucial winter range as a result of displacement/stacking from State and private lands. Reclamation would be performed on about 65 acres of elk habitat over a 10-year period, but the effectiveness of this work would not be realized for 15-20 years.

Elk winter range conflict with livestock grazing appears to be minimal. However, there were some impacts to elk from the range proposals of this alternative. Approximately 3,000 acres (about 300 acres/year) of elk range in the CAP area could be improved by the proposed grazing system changes over the next 10 years. The forest and rangeland proposals (mostly burning and chaining) could improve as much as 1,000 acres of habitat in 10 years.

Elk habitat could be improved through voluntary habitat compensation efforts. Since elk are mobile, it is possible that they might be attracted to some nearby areas of lesser impact by habitat compensation projects.

**Moose** - Impacts on moose are similar to those for mule deer, but the magnitude of the impact is different.

Within the CAP area, moose typically frequent creek bottom and riparian meadow areas as their principle habitat. Public lands with this type of habitat would normally be heavily stipulated against surface disturbance. Most of this type of habitat, however, occurs on private lands (56%) and State lands (6%), and is out of the control of BLM.

Poaching and accidents are expected to decline by an estimated rate of one moose per year in this alternative in the CAP area. Impact predictions at these low levels are not reliable, but they can help bracket the relative magnitude of effects. Hunting pressure is expected to increase in the next year or two and then drop off considerably in 5-10 years.

However, for the purposes of this analysis, moose displacement impacts were considered on the same

footing as for other big game animals. It was estimated that long-term displacement from State and private lands would affect roughly 56 moose per year in the CAP area in this alternative during the winter period. Short-term displacement was estimated to affect approximately 100 head per year from all land ownerships.

Surface protection stipulations applied to mineral development activities and use restrictions on other activities on the public lands in the CAP area may prevent the displacement of an estimated 45 moose per year.

About 10 acres per year of moose habitat in the CAP area (primarily on State and private lands) are expected to be lost to surface disturbing activities. Approximately another 1,540 acres per year of moose habitat is expected to be further degraded by displaced animals overusing adjacent lands. Some moose habitat (about 55 acres) will be reclaimed in the next 10 years, but this reclamation cannot be expected to be fully effective for at least 15-20 years. Since most of this reclamation will be on private land, the quality and success of the reclamation may vary widely.

The degree to which livestock management activities on the public lands in this area will affect moose habitat is uncertain. Livestock grazing systems on the uplands may help draw some stock off the bottom lands, thereby relieving some grazing pressure and improving the habitat. This beneficial impact was estimated to improve 500 acres of moose habitat in the CAP area.

It is anticipated that some of the proposed aspen rejuvenation work (100 acres) would also help improve the moose habitat situation in the CAP area over the next 10 years. However, the results of this effort are not likely to be realized for 15-20 years.

**Sage Grouse** - The same impacts work on game birds as for big game animals in this alternative, but there is often a profoundly different effect on birds and their response is often significantly different.

Some poaching can be expected and animals are apt to be lost as a result of accidents and hazards, although these impacts are extremely difficult to quantify. Hunting will remove some animals from the CAP area, although this varies considerably from year to year.

Vehicular traffic associated with mineral development and other activities is expected to cause some displacement of sage grouse in the CAP area. This displacement is, in most cases, a short-term flight response for short distances, and except in the most extreme situations (e.g., severe weather conditions, from a breeding area, etc.), is probably of little consequence.



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Surface use restrictions on public lands are expected to prevent some animal displacement that would likely have otherwise occurred, though this impact is not quantified.

It is expected that about 72 acres of habitat annually will be lost to development activities in the CAP area. Not all of this acreage is likely to be "prime" sage grouse habitat. Only about 15% of the occupied sage grouse habitat is thought to be high quality nesting habitat. Reclamation of old well sites and roads should improve about 60 acres of habitat per year. The effectiveness of this reclamation is not apt to be fully realized for 15-20 years.

The ¼ mile restriction on surface occupancy around leks is expected to protect about 2,300 acres of crucial habitat in the CAP area.

Adjustments in livestock grazing systems should help improve the quality of roughly 5,000 acres of sage grouse habitat in the CAP area over 10 years (average of 500 acres/year) by improving the quality of nesting cover and foraging areas. The proposed vegetation manipulations are also expected to improve about 10,000 acres (1,000 acres/year) of habitat for the same reasons, although some of this will not become effective for 10-15 years.

Voluntary compensation efforts could also improve sage grouse habitat in the CAP area.

**Raptors** - The birds of prey of principle concern in the CAP area are golden eagles, red-tailed hawks, and prairie falcons. The principle impacts include disruption of nesting, affects on prey base, and direct mortality.

Accidents, harassment, and intentional poaching could lead to an unquantified loss of some raptors in the CAP area. The level of human activity in this alternative, however, is expected to decline slightly from 1989 levels; therefore, adverse impacts to raptors could be expected to decline slightly also over a period of several years.

Human activities associated with continuing mineral development actions in the CAP area is expected to cause at least a temporary displacement on State and private lands of about 10 nesting raptors (5 pair) per year in this alternative.

Restrictions on human disturbance and activities (including mineral development on public lands) in the CAP area are estimated to prevent the displacement of approximately 6 nesting raptors (3 pair) annually.

Because of their short duration and low intensity, oil field maintenance activities will likely have only a minimal effect on raptors in the area.

**Waterfowl** - The potential exists for some waterfowl mortality in mud pits and produced water disposal pits associated with oil and gas drilling, especially during migration. These sites in the CAP area include the larger reservoirs (such as Sixty-Seven) and backwater sloughs and islands along the Green River.

**Fish** - Accidents and hazards of development could adversely affect an estimated 10% of the fish populations over a 10-year period.

There is a slight possibility (less than 1%) that instream flows could be affected (and quantity of fish habitat) by development activities, but most water used for mineral development is either reinjected or evaporated and, therefore, not returned to streams.

It is estimated that there is a 10% chance of a decline in water quality through increased siltation, turbidity, and temperature due to development activities in the CAP area.

Proposed grazing system adjustments on the public land stream segments are expected to improve the riparian habitat quality by about 15% or more over a 10-year period through better streambank vegetation and stability.

Surface protection stipulations are expected to maintain habitat on about 5 miles of public land stream in the area. By exercising these use limitations, it is estimated that less than 10% of the public land stream segments will realize any habitat degradation by development activities.

**Threatened and Endangered Species** - In accordance with the Section 7 consultation requirements of the Endangered Species Act (ESA), a detailed biological assessment will be prepared for the CAP area. As a result, the impacts discussion presented here is brief.

Increased vehicular traffic is estimated to cause temporary displacement of some bald eagles. This displacement is a minor overall impact to the eagles since it is mostly avoidance response. Some bald eagles will be lost to poaching and accidents but probably not above current levels. Foraging opportunities for eagles may increase, however, with the presence of more big game animal carcasses to feed from in the CAP area.

Peregrine falcons are present in the CAP area during migration, and a possibility exists that falcons could nest in cliffs along the Green River adjacent to the CAP area. Impacts here are uncertain at this point, but the possibility exists that reestablishing peregrines could be affected by activities in the CAP area.



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Whooping cranes and black-footed ferrets are not expected to be impacted in this alternative. Some relatively large prairie dog towns (potential ferret habitat) do exist adjacent to the CAP area northeast of Big Piney, however, and these areas do need to be mapped and searched for ferrets.

The Colorado squawfish, humpback chub, and razorback sucker may be affected by water depletions of the Green River drainage in the CAP area. The status of all of these fish can be related to decreased water flows in the Upper Colorado River Basin.

### Cumulative Impacts

Alternative A is considered a desirable management approach for the wildlife resource on the public lands. This alternative provides a relatively high degree of wildlife resource protection and management with mostly minor impacts, while still providing for an active and broad range of other multiple use activities.

The number of animals lost is not significant for any species or species group. Displacement of wildlife populations is not significant. The indirect impacts of displacement on habitat (stacking), however, do worsen an already bad situation. Overlap of livestock, deer, and antelope use of crucial ranges accelerates this problem. Habitat lost directly to surface disturbance is relatively minor in this alternative. Habitat improvement, primarily through better livestock grazing systems and vegetation manipulation, is a beneficial impact for all major species and species groups in this alternative.

### Mitigation

In addition to the mitigation measures (requirements) inherent in this alternative, the following possible measures could be added to offset impacts. These mitigation measures would be specific requirements that must meet compliance. These requirements would be included in right-of-way grants, approved APDs, and other authorizations.

1. State wildlife laws and regulations will be posted in conspicuous places at the job sites and work camps.
2. Where the Authorized Officer determines that rehabilitation of temporarily disturbed areas within crucial wildlife habitat on Federal lands has not been successful within 3 years from disturbance, the company will be required to reseed the area. Temporarily disturbed areas do not include those covered by permanent facilities like road beds, well site equipment, etc.

3. Ponds and reserve pits will be fenced with small mesh wire to protect terrestrial wildlife. If determined by the Authorized Officer, it must have sufficient deterrents to keep waterfowl and birds out of the pit.
4. Colored markers will be hung on transmission lines to increase visibility of wires over river and stream crossings within known bald eagle concentration areas to reduce eagle and sandhill/whooping crane collisions with wires.
5. Staging areas for stream crossing equipment will be located outside of the stream's riparian zone to reduce the possibility of silt entering into streams and to reduce disturbance to vegetation in the riparian zone. A maximum construction right-of-way of 25 feet would be used in riparian areas to reduce disturbance. Variances to this must be approved by the Authorized Officer.
6. The companies may be required to develop and implement a sediment monitoring plan to be approved by the Authorized Officer.
7. In the event it is necessary to remove a beaver pond which has flooded an existing road, the applicant will initiate consultation with the WGFD and BLM.
8. To minimize the impacts of activities on streamside and fisheries habitat, the BLM will make every effort to implement the WGFD (Fish Division) Standard Environmental Considerations, where appropriate, in BLM authorized actions.
9. Let-down panels or gates will be installed in proposed fences that occur in crucial wildlife habitat and migration areas to allow wildlife passage.

### Residual Impacts

Residual adverse impacts are expected to be minimal if the management proposals of Alternative A are diligently pursued.

Regardless of all the environmental protective constraints and habitat management actions of Alternative A, there will still be animals lost or displaced as a result of land management activities. Accidents, vandalism, and poaching do occur, and some habitat will be lost to development and use.

Certain events will occur which will have a resulting impact on wildlife populations, even if no human activity occurred in the area. There is very little control that can be practically placed on some of these events/impacts, but they must be considered to gain a proper perspective on the condition and welfare of the wildlife populations.



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Climatic conditions (principally during the winter months) are the single most significant impacting factor on game animal populations in this area. Individual severe storm events can lead to the death of animals due to disorientation and exposure. Occasionally, these losses may run as high as a quarter of the local population, or more. Cold, wet weather during hatching/brooding season for game birds can also drastically reduce the survival rate for young birds. High runoff from storm events can occasionally "flush" fish populations from some streams and/or drastically alter the quality of the habitat. Extensive periods of low temperatures (0° F and below), coupled with deep and crusted snow, can decrease forage availability and create an excessive "energy deficit" in wintering animals, often leading to unusually high mortality in the population. This circumstance is most evident on winter ranges in poor condition such as currently exists in the CAP area. Good range conditions during severe winters can help "buffer" this adverse impact.

Conversely, mild winter conditions can often "release" animals from the normal rigors of winter and allow populations to expand rapidly. This appears to have been the case with the mule deer herds in the CAP area.

Disease epidemics occur from time to time in most wild animal populations, regardless of human activities in the area. The severity and duration of these events vary, but seldom do these events totally eliminate an animal population. There are no major disease occurrences thought to be impacting wildlife populations in the CAP area at this time. Predation is rarely a major impact on healthy, undisturbed wildlife populations.

Regulated hunting and fishing are often the only practical management tools available for controlling the size of most game animal populations. The setting of season types, dates, and duration, however, is a very politically sensitive process affected by public opinion and perceptions, and this sometimes results in a "lag period" between the biological management needs of a population and the implementation of corresponding management actions. The WGFD has currently instituted very liberal hunting seasons in the CAP area in an attempt to bring mule deer populations in line with prescribed management objectives. This management effort is expected to have a significant impact on mule deer by helping reduce their current populations.

### D. Livestock Grazing Management

This alternative would result in a loss of 290 AUMs of forage in the short term and 234 AUMs in the long term. Road hazards to livestock would stay approximately the same as the current situation. Poisonous

plants and noxious weeds could invade disturbed sites.

The reclamation of 200 wells and 110 miles of roads will add 810 acres or about 56 AUMs of additional forage. Poisonous plants, noxious weeds, and road hazards will be reduced.

Vegetation manipulations of sagebrush will improve livestock forage. Grass production would increase initially by about 250% and would remain substantially greater for up to 30 years. A proposed 2-year rest after treatment would cause minimal impact to livestock operations. However, detrimental impacts will be realized if halogeton invades treated areas of sagebrush/salt desert shrub vegetation.

Reservoir reconstruction in the Deer Hills Allotments will benefit livestock operations by providing more stock water. The proposed riparian enclosure will not affect livestock operations.

Pit and pipeline reconstruction in the Upper North LaBarge Allotment would benefit livestock operations by providing additional livestock water.

Grazing treatments, changes in livestock management, or permitted numbers will not be implemented until after an AMP is developed and implemented for the North LaBarge and Calpet Common Allotments. Fences facilitate livestock management so are beneficial to livestock operations. The proposed water developments (wells, pipelines, and reservoirs) also benefit livestock operations. Adjustments in livestock management implemented in an AMP would be beneficial to livestock operations by providing for long-term productivity of the range. Some short-term hardship on the livestock operators could result if permitted numbers are reduced and livestock management is complicated by a grazing system.

Construction of range improvements could be delayed because of restrictions imposed through cultural resource protection measures. This could negatively impact livestock management by delaying or eliminating needed range improvements.

If utilization of riparian areas is limited to 40 or 50% of the current years growth, the impact would depend on how the limits are implemented. It will not be known exactly how the limits will be implemented until AMPs for the various allotments are completed. In order to analyze the range of impacts that could occur two scenarios are considered. The first scenario assumes that riparian areas (1620 acres) would be fenced off and cattle would be allowed to graze within the riparian areas until the utilization limit is reached. This scenario would result in only a slight impact to livestock operations with no reduction in AUMs, but some slight inconvenience to operators.

The second scenario assumes that all livestock will be removed from the allotment when the utiliza-



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tion on riparian areas reaches 40 to 50%. The impact of this scenario would be severe resulting in an estimated reduction of 19,171 AUMs. This is because these available AUMs could not be utilized without exceeding the 40-50% use limit on riparian areas.

There are presently 20,603 total AUMs available annually for use in the CAP area. Under Scenario 1, management actions under this alternative would at least maintain this level of available AUMs. If all of these AUMs were utilized by livestock operators, they would return \$1.81/AUM (or \$37,291) to the Federal Government each year. *Wyoming Cow Country, Vol. 118, No. 4, October 1990*, estimated that each AU of livestock production in 1987 generated an average of \$52 of direct personal income to households in the livestock sector in Wyoming. Therefore, if all 20,603 of public AUMs in the CAP area were utilized by livestock operators to produce a yearly total of 4120 AUs, it would result in over \$214,000 of total personal income to operator households each year. It would also result in total personal income to Sublette County of over \$722,000 annually. This estimate is based on an income multiplier of 3.37/\$1 of livestock sector personal household income.

The second scenario for this alternative would result in a 19,171 AUM reduction in available use per season. This equates to a \$34,700 annual loss in grazing fees to the Federal Government and an increase of \$136,497 in annual cost (\$171,197-\$34,700) to livestock operators to purchase replacement pasture. An 11 Western State average of \$8.93/AUM is assumed as the replacement cost of private pasture, and it assumes that replacement pasture could be acquired, which is doubtful. If private AUMs are not available in the CAP area, operators would need to either buy replacement forage for livestock or move them to areas outside of the CAP. If circumstances prevented the operator from doing either of these, the operator might have to go out of business, in which case the costs to the operator and the county/local area would be greater than estimated here.

Assuming that the operator does not go out of business and that the 19,171 AUMs supported 3834 AUMs of livestock production each year, the related loss in annual personal income to affected livestock sector households would total almost \$200,000. The resulting loss of personal income to the county would approach \$672,000 yearly.

### Cumulative Impacts

Forage loss due to oil and gas development in this area would continue to increase as development continued. The incidence of noxious weeds and poisonous plants would increase over those already in the area as a result of disturbance. Road hazards to livestock would be approximately the same. Range

and wildlife habitat improvement projects including vegetative treatment, AMP development, water projects, and fencing would have a cumulative long-term beneficial impact on livestock operations.

### Mitigation

Successful reclamation would minimize the impact of forage loss. Road hazards could be mitigated by fencing ROWs.

### Residual Impacts

Not all forage loss could be mitigated, and it is expected that 3,399 acres and 234 AUMs of forage would be lost for as long as 90 years. There would be some minor increase in noxious weeds and poisonous plants. It is not expected that ROWs will be fenced, so road hazards would not be mitigated.

## E. Vegetation

The proposed development level will disturb 4,209 acres short-term and 3,399 acres long-term. Reclamation in this area has not been very successful in the past due to a variety of reasons, including poor reclamation techniques and drought. Life expectancy of the wells is between 35 and 90 years. The process of natural succession would begin on disturbed areas and, by the time the well is abandoned, these areas would probably look very similar to the surrounding vegetation. Pioneering species in this area are annual and biennial weeds: principally *Kochia scoparia*, a plant that is palatable and nutritious to livestock; and lesser amounts of *Halogeton glomeratus*, a poisonous plant; and Russian thistle, and black henbane, usually considered to be nuisance weeds. These plants could dominate these sites for 5 or more years until perennial vegetation becomes established. Successful reclamation would considerably speed up this process. The reclamation of 110 miles of roads would have a beneficial impact on the vegetation.

It is proposed that procedures outlined in Appendix A would be used to guide reclamation within the CAP area. While Appendix A contains many reliable and proven reclamation procedures, since past reclamation has not been very successful in the CAP area, alternative methods of seeding, site preparation, and protection will be necessary if revegetation is to be effective. The reclamation requirement in Appendix A that all seed must be drilled could be ineffective for rehabilitation unless specialized drilling equipment is used for species such as sagebrush. Success seeding shrubs is often erratic due to a lack of satisfactory planting equipment. Sage-



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brush seed germination is also erratic. Seeding to shrubs such as mountain big sage, rubber rabbitbrush, and bitterbrush has been successful on mined land when shrubs were seeded alone at 4-5 lbs./acre or when seeded with grass at over 20 lbs./acre. However, sagebrush seeding is a high risk venture. Plant materials center released cultivars are generally more successful than collected wild seed. For example, a seed mixture for highly saline sites would include the cultivar names proven to be successful in highly saline areas such as: Alkar Tall Wheatgrass, Pryor Slender Wheatgrass, and Sodar Streambank Wheatgrass. Research has also shown that successful revegetation on disturbed mine lands in the salt-desert vegetation often involves soil amendments such as organic matter to improve soil structure and increase moisture availability.

Impact of chaining, burning, or spraying sagebrush to remove old decadent sagebrush plants and replace them with young vigorous plants is mixed. Some experts believe that natural establishment of sagebrush occurs only under several successive years with ideal climatic conditions for seed production, germination, and establishment. This seems to occur on average of once in 10 years. One study found that after 12 years, 10% of the original sagebrush cover had returned in a burned area, and after 30 years, 100% of the original cover had returned. It will probably be 20-30 years before present sagebrush cover returns in this area. However, west of the Continental Divide near the Wyoming range, climatic conditions are thought to be more favorable to sagebrush establishment. Grass and forb production could be expected to increase substantially for up to 20 years or more. Spraying herbicide is the preferred method where rabbitbrush is a significant component of the vegetation as chaining or burning tends to favor rabbitbrush because of its sprouting ability.

Chaining, burning, or spraying mountain shrub vegetation is proposed to enhance wildlife habitat. Chaining is probably impractical on most mountain shrub types due to slope, so burning is the probable method. Fire affects different species in different ways. If conducted under the proper prescription, mountain shrub sites can be enhanced.

Chaining, burning, or spraying sagebrush-salt desert shrub vegetation has unknown impacts. Research on treatment of salt desert vegetation types is lacking. Salt desert shrub areas are difficult to revegetate and on those with a shrub cover of greater than 1625 plants per acre, cover might be more harmed than helped by manipulative processes.

Treatment of aspen stands is difficult as aspen forests do not readily burn. But when aspen do burn, the trees are easily killed. A fire intense enough to

kill the overstory will stimulate abundant suckering. Cutting and herbicide application also greatly stimulates aspen suckering.

It is proposed to integrate seeding Wyoming big sagebrush, winterfat, and fourwing saltbush into revegetation efforts on disturbed areas within the CAP area. While planting sagebrush seedlings has been successful, it is difficult to establish a stand from seed. If the disturbed area is small, and topsoil is not lost, natural reestablishment of sagebrush will occur fairly rapidly. Winterfat and fourwing saltbush have been successfully seeded in mined land reclamation.

Reservoir reconstruction in the Deer Hills Allotments and Upper North LaBarge Allotment will have an overall positive effect on the vegetation by providing for better overall distribution of livestock and better overall range condition. There will be some adverse impact to vegetation near reservoirs from livestock trailing into water and congregating around the reservoirs. The proposed 10-acre riparian enclosure will benefit vegetation on 10 acres. Fences also benefit vegetation by providing for improved livestock management.

Adjustments in livestock management that would be implemented by an AMP would in the long-term be beneficial to vegetation by improved livestock management to provide for the physiological needs of the plants. A grazing system and proper carrying capacity should result in substantial improvement in range condition over most of the area within 10-20 years. The proposed monitoring would ensure that the objectives were being attained, and would assure that overuse of vegetation because of conflicts between livestock and wildlife, poor livestock distribution, or overstocking would not occur.

The impacts of brush beating in the O'Neil Individual Allotment are essentially the same as chaining, burning, and spraying, and were discussed above.

Limiting utilization levels on riparian vegetation to 40-50% of current year's growth would be very beneficial to the vegetation. Results would probably be apparent in less than 5 years.

Vegetative disturbance has been occurring in the CAP area due to oil and gas development and some 3,309 acres remain committed to well pads and roads. Reclamation efforts in the CAP area have not always been very successful. Since development has been fairly uniform throughout the CAP area, the loss of the various vegetation types should be fairly close to the proportionate amounts of each vegetation type in the CAP area. An additional 900 acres will be disturbed under this alternative; however, all but 90 acres will be reclaimed in the short-term. Plant succession on disturbed areas is discussed above.



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Constraints on grazing and surface disturbing activities for watershed protection are designed to minimize soil erosion, principally by maintaining good vegetative cover especially in flood plains, and are thereby beneficial to the vegetation.

### Cumulative Impacts

Vegetation disturbance due to oil and gas development in this area would continue to increase as development continued. Vegetative manipulation projects such as chaining, burning, and spraying will result in a long-term alteration of the natural vegetation on approximately 12,500 acres. Burning is the most natural of these treatments, so it could be considered the least detrimental from an ecological standpoint. Range and wildlife habitat improvement projects such as AMP development, water projects, and fences, as well as the vegetation manipulation projects discussed above, would have an overall long-term beneficial impact on the vegetation in the area as a result of improved livestock management and improved wildlife habitat.

### Mitigation

Successful reclamation would minimize the impact of vegetative disturbance due to oil and gas development. Vegetative alteration would not be mitigated. Should continued high deer numbers hamper treatment success due to overbrowsing, the range will be monitored by BLM and WGFD and further population control may be required.

### Residual Impacts

Approximately 3,399 acres of vegetation would remain in a disturbed state for up to 90 years. Vegetative manipulation would result in alteration of the natural vegetation for up to 30 years.

## F. Recreation

Under the present situation, there are approximately 1,000-1,500 visitor days annually in the CAP area. This visitor use breaks down to 800-1,000 days of ORV related recreation with 400-500 of that being antelope hunting and 200-250 sage grouse hunting with a 4WD, and the other 200-250 days being other ORV activity. There are 200-500 visitor days of water related recreation in the CAP area associated with the Green River which forms part of the eastern boundary of the CAP area and associated with the streams and lakes in the area.

An estimated 50-60% of the total recreation use in the area is generated by the local population. Under Alternative A, which is a continuation of the present situation as modified by the planned actions set forth in the Pinedale RMP, the following cumulative impacts would accrue to the recreation program:

### Effect of the Oil and Gas Program

The three scenarios presented in the socioeconomic discussion under Alternative A are the basis for the following analysis of the effect on recreation use.

**Scenario 1** - Would require the drilling activity to take place during August 1 to November 15 each year. This would concentrate the recreation use during the period when the nonresident oil field workers are in the area. The spring and early summer fishing season on the streams and lakes in the area would generate fewer visitor days without the nonresident oil field workers there. Under this scenario, the water related recreation use would be an estimated 100-300 visitor days. The nonhunting ORV activity would drop to an estimated 200-400 visitor days. Total visitor use under this scenario would be 700-1,200 visitor days.

**Scenario 2** - Under this scenario, the nonresident workers would be in the area for the spring and summer seasons. Visitor use would not be substantially different from the present situation. Total visitor use would be an estimated 800-1,300 visitor days.

**Scenario 3** - Since this scenario allows drilling almost the entire year, the oil field workers would likely remain in the area year-round. Total visitor use would be the same as the present situation.

### Effect of the Range and Wildlife Programs

Both of these programs propose actions that would be beneficial to the resident wildlife populations. Improved habitat would in turn provide increased or at least stable hunting and fishing opportunity to offset the loss of habitat from increased drilling activity. Overall, these programs would stabilize the present situation visitor use in the CAP area.

A stable or increased wildlife population will allow the WGFD the opportunity to maintain or increase the amount of hunting allowed which results in increased hunter use days and increased recreation related income to the local economy.



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The other resource actions under Alternative A (vegetation, soils, cultural, etc.) would have a negligible effect on the recreation program.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

Under Alternative A, the three oil and gas scenarios would generate varying levels of visitor use. Scenario 1 would reduce the impact of ORV activity on wet soils during the spring and early summer. Even though this scenario is not a mitigation measure, and it would result in fewer visitor days, the absence of nonresident oil field workers in the area during the wet spring months would be beneficial to the recreation resource base.

### Residual Impacts

Analysis has not indicated any residual impacts.

## G. Cultural Resources

A variety of actions will take place under this alternative that have the potential to affect cultural resources. Oil and gas development is expected to physically disturb 4,950 acres within the CAP.

The planning area is open to consideration for leasing and development for all solid leasable minerals, including coal, oil shale, and geothermal steam. Salable minerals (sand and gravel) will continue to be made available on public lands. Potential surface disturbance can be expected from actions related to vegetation management (e.g., chaining, prescribed burning, tree dozing), range management (e.g., fencing), and disposal of public lands.

Impacts could include the physical destruction or alteration of prehistoric and historic archaeological sites, above-the-ground historic features, trails, and structures, and Indian traditional and religious sites. Impacts could also include the introduction of audible, visual, and atmospheric elements out of character with the present environment, thereby compromising integrity. Direct impacts physically modify the terrain during a single time period. Indirect impacts tend to occur over a longer time and can be cumulative in effect. Access to previously remote sites and population increases in an area tend to increase the likelihood of cumulative indirect impacts. Any impacts to even a portion of a cultural resource base would likely result in a loss of scientific and cultural information for future research.

Cultural properties within the planning area that appear to be eligible for the National Register of Historic Places would be protected under the National Historic Preservation Act and its implementing regulations (36 CFR 800). Prior to any surface disturbing activity that could result in changes in the character or use of a National Register quality property, the procedures specified in 36 CFR 800 would be followed. For any such discretionary activity, consultation over site identification and effects would be carried out with the Wyoming State Historic Preservation Officer and the Advisory Council on Historic Preservation.

The BLM's standard cultural resource stipulation will be included in any authorization. This stipulation requires the operator to stop operations and notify the Authorized Officer when cultural resources are encountered during construction activities.

Since the exact locations of future surface disturbing activities are largely unknown, and much of the planning area has not been surveyed to identify cultural resources, specific impacts cannot be predicted. The proposed alternative would directly affect a number of sites eligible for listing on the National Register of Historic Places. These sites include those not identified by Class III inventory, or whose existence does not come to the attention of the Authorized Officer during project implementation.

Sites of National Register quality that cannot be avoided would be mitigated through excavation, stabilization, monitoring, protective barriers or signs, or other physical or administrative measures. If compliance procedures are not followed, the effect could be adverse, resulting in a loss of information about the prehistory and history of the region.

Additional adverse effects could be caused if an operator is allowed to relocate a project away from a cultural resource site it has already disturbed. Unless funding becomes available through the Bureau, data recovery will not occur at these sites. Increases in population resulting from heightened land use activities in the CAP area could increase direct and indirect impacts currently being observed in the area. These impacts include direct construction effects, site deterioration through neglect, looting, vandalism, illegal excavation, and artifact collecting.

### Cumulative Impacts

Increased numbers of people resulting from all activities such as oil and gas development, recreational use, fence construction, road reclamation, range improvement projects, chaining, and burning could all increase short-term, indirect impacts. Such impacts could include looting and vandalism of archaeological and historic sites, illegal excavation, and artifact and fossil collecting. If these activities



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are discovered, the disturbed site can sometimes be salvaged through excavation, stabilization, and recordation. In most cases, these illegal activities will go undocumented and the site will suffer an adverse effect without any type of mitigation or salvage.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## H. Paleontology

Fossils may be impacted during right-of-way clearing, well pad and access road construction, and construction of ancillary facilities. As a result, significant scientific information could be irretrievably lost. If paleontological inventories in sensitive areas are conducted in response to a proposed undertaking, and if significant sites are mitigated, disturbance and destruction to paleontological resources should be minimized. Inadequate inventory and mitigation, however, could result in much knowledge about significant fossils being lost.

Except for obvious features such as bones, paleontological resources are not easily recognized by the untrained eye. Even though the BLM requires that sites discovered during an authorized project be reported to the BLM, sites may be destroyed by failure of the operator to recognize features as important paleontological remains. The result is that paleontological resources in the CAP area could be destroyed without any knowledge of the sites' existence.

### Cumulative Impacts

Increased numbers of people resulting from oil and gas activities, recreational activities, fence construction, road reclamation, range improvement projects, chaining, and burning could all increase short-term, indirect impacts. Such impacts could include looting and vandalism of paleontological sites, illegal excavation, and fossil collecting. If these activities are discovered, the disturbed site can sometimes be salvaged through excavation, stabilization, and recordation. In most cases, these illegal activities will go undocumented and the site will suffer an adverse effect without any type of mitigation or salvage.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## I. Transportation

The CAP provides several proposals to modify the existing transportation system. These include: inspect and evaluate the existing road system; eliminate 110 miles of unpaved roads; upgrade an undetermined number of miles of road using improved surfacing and drainage measures; modify existing road alignment, require surfacing, etc., to reduce safety concerns along their route; in general to upgrade existing roads to meet BLM road design standards; for new access roads areas having erosive soils, steep slopes, and mountain shrub vegetation will be avoided when practical. Each of these proposals will have an affect on both the transportation system and on the users of the road network. A discussion of affects on the users is covered in the ORV, oil and gas, and other sections of this impact analysis. Affects of these proposals on the transportation system itself are discussed in the following paragraphs.

The 15% reduction in road miles (110 miles) will directly increase the volume of use each of the remaining roads receive. Because the roads to be abandoned have not yet been identified, the volume increase to remaining roads cannot be determined. Increased use generates increased maintenance requirements, associated costs, and higher likelihood of traffic accidents on those roads absorbing most of the traffic increases. However, the total reductions in road miles in conjunction with other proposed road improvements will off-set some of these costs and additional negative impacts.

Roads being upgraded to BLM standards will be beneficially impacted by reduced maintenance requirements (due to erosion and rutting) and increased safety for their users. Initial increases in construction costs should be off-set by long-term reductions in maintenance expenditures.

Avoiding steep slopes, erosive soils, and mountain shrubs will adversely impact the efficiency of the transportation system to provide access to certain areas in the CAP area. Beneficial impacts will result by reducing the number of roads having high maintenance costs and, unless constructed to BLM road standards, unsafe driving conditions.



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An increase of 75 miles of road (11%), 25 miles of powerlines (13%), and 75 miles of pipeline (7.5%), will occur as a direct result of planned mineral development in the CAP area.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## J. Visual Resources

Visual Resources Management (VRM) classes describe the visual quality, relative importance to the viewer, and allowable contrast for a given geographic area. The VRM classification is established during the RMP process.

The CAP area is not recognized nationally or regionally for its outstanding visual quality. Therefore, this section addresses visual impacts only to the CAP area and its immediate surroundings. It does not consider regional or national consequences for impacts to the area's visual quality.

Some of the proposals described in the CAP will have a negative impact on the visual resources, while others will improve the area's visual quality. The following analysis addresses only those proposals, described in the CAP, that will result in a noticeable (positive or negative) impact to the visual resource values in and immediately around the CAP area.

Since the Guidelines for Surface Disturbing Activities will be complied with in permitting each of the APDs, the proposed development will only slightly impact the visual resources of the CAP area. There will be an increase in activity levels and the amount of surface disturbance in the CAP area. The proposed wells and other facilities will be developed with similar density and distribution and will not alter the visual characteristics of the area.

Road upgrades, including surfacing, curve widening, crown and ditch construction, improvements to cross drain systems, etc., will have a moderate negative impact, during the short-term, to the area's vis-

ual quality. Unvegetated road sides, unreclaimed borrow areas, realigned drainages, and new gravel surfacing will contribute to increased visual contrast along upgraded road corridors. However, over the long-term, the improved roads will reduce the off-site side effects of under designed travel ways, reduce maintenance intervals, and generally improve the visual quality in the area.

Due to the construction related disturbances, the proposed reclamation efforts will result in short-term adverse impacts to the area's visual resources. Assuming good reclamation success is attained, the long-term impacts of the proposed reclamation on existing disturbances will substantially reduce the current surface disturbance related visual impacts in the area.

The short-term visual impacts of the proposed vegetation manipulation efforts will result in an adverse impact to the visual quality of the area. However, the level of visual impact is directly related to how the manipulation project is laid out and the amount of time the finished operation has had to recover. Due to the unpredictable application, overall success rate, and edge control during burning and chemical treatments, they will create the least amount of short-term adverse visual impacts. Due to straight edges, surface disturbance, and consistent coverage, chaining and brush beating will result in a moderate adverse visual impact. Over the long-term, slight negative impacts will remain from the chaining manipulation. A slight to moderate positive impact will result from any of the other three manipulation efforts.

Visual impacts similar to that described above will result from the aspen stand treatment. However, impacts will be more severe in the aspen due to the visual dominance of the aspen as compared to the shrubs in their respective areas.

As development continues to occur, proposed mitigation to reduce visual contrast in the CAP area including painting, screening, improved location of facilities, etc., will become the single most effective technique used to reduce overall visual impacts in the CAP area.

The addition or improvement of the CAP's surface water resources will have a moderate to significant beneficial impact on the visual resources in the immediate area of the water development. The addition of water adds diversity, color, and movement to an area. In addition, the availability of surface/ground water will provide conditions for wetland vegetation and shrub cover to become established around the reservoirs adding increased vegetative diversity, improving the visual quality of the immediate area.

The reduction of grazing pressure will result in the development of wetland vegetation and protection



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of newly revegetated areas to help ensure reclamation success. The visual impact of the enclosure fences will be an insignificant and localized visual impact in the CAP area.

Improvements to the vegetative resources, resulting from modifications in current grazing practices, will generally improve the visual quality of the CAP area by improving vegetative diversity and cover.

### Cumulative Impacts

Some of the proposals included in Alternative A will result in short- and long-term adverse impacts to the area's visual resources. Others, however, will have a short-term adverse impact, then, over the long-term, will improve the area's visual quality. The following actions will result in short-term adverse visual impacts, then serve to improve the overall long-term impacts: road improvements, reclamation of old disturbances, burning and chemical vegetation manipulation, reservoir construction, and construction of grazing enclosures. Mechanical vegetation manipulation efforts will result in slight long-term adverse visual impacts, unless extra care and precaution is taken when designing, laying out, and implementing the treatment. The development of an additional 300 wells and associated roads, and other support facilities will result in a moderate adverse impact on the visual resources of the CAP area.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## K. Lands and Realty

This alternative parallels BLM's ongoing realty program in the CAP area.

Both BLM's and the applicant's right-of-way processing costs are likely to increase over time under this alternative due to inflation and new regulatory requirements. Seasonal or other stipulations required by this alternative which regulate private use on public lands may increase right-of-way holder's operational costs, and may cause some construction delays.

Public land would be made available for community expansion as needed. Land uses allowed after the land is sold will be controlled by State law, county rules, and local zoning ordinances. All sales of public land would be consistent with local land use plans.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## L. Salable Minerals

Under this alternative, the number of pits that presently exist in the CAP area will be able to supply the salable resources for the next 15 years.

The environmental consequences for the existing six pits which cover 110 acres cumulatively, have already been considered when the pits were originally opened. There will not be any increase in the environmental consequences over what presently exists.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.



### M. Soils

Surface disturbing activities such as oil, gas, and other mineral development, roads, ORV use, and livestock grazing can have short- and long-term on-site impacts to the soil resource. The magnitude and duration of impacts associated with the CAP depends upon the extent of soil disturbance in terms of soil bared to erosive forces, physical and chemical soil properties that affect soil productivity, and rehabilitation success or failure. The risk of soil impacts will be higher on steeper slopes with limited rehabilitation potential (refer to Map 4, Special Management Soils).

Drill pad, pipeline, and other oil and gas facility construction necessitates the removal of vegetation. Subsequent disturbance and exposure of soils to wind and water will almost always result in accelerated soil erosion caused by these activities. The degree of erosion is dependent, in part, by the severity and length of the slope disturbed. Cuts, fills, and stockpiles created during development are particularly susceptible to erosion due to steep slopes and the lack of vegetation.

Other impacts associated with construction and development may include damage to surrounding vegetation and soils through burial with salty soils used for fill material; sedimentation into ephemeral and perennial streams; accelerated erosion from construction caused slope failure; decrease of on-site productivity due to mixing with poor quality soil; soil contamination from machinery and drilling fluids, production chemicals, and reserve pits; gullying along pipeline excavations; disturbance of unstable slopes; use of frozen fill material resulting in a potential for mass wasting; and sedimentation from unsuitable stream crossings and poor culvert installation.

Although solid leasable (coal) and salable (sand and gravel) exploration, and development are expected to be minimal in the CAP area, impacts could occur to the soil resource. In addition to the erosion that could occur from bared spoil and top soil piles, surface mining can also cause an alteration of soil structure and porosity which affects permeability, infiltration rates, water holding capacity, and bulk density; a disruption of nutrient cycles and a decrease in organic matter content affecting fertility; and contamination of topsoil with salt laden or toxic subsoils.

Road construction due to all development activities has the greatest potential for impacts. Increased runoff rates due to impermeable road surfaces could continue erosion losses along roads. This impact could be a problem on all unsurfaced roads but would be the most serious on the steeper slopes on the special management soils.

Impacts associated with off-road vehicle (ORV) use are similar to regular roads. ORV use cross country (not following established roads and trails) leads to compaction of the soil surface, channelization of water, and the eventual formation of ruts and gullies. Like roads, these impacts would be the most serious on the special management soils.

Continuous grazing, poor livestock distribution, poor livestock salting and water locations, impact soils through compaction, depletion of vegetative cover and productivity resulting in accelerated soil erosion. Of particular concern is the livestock use in and around wetland and riparian areas. Streambank erosion and general degradation of the soils in a riparian environment can widen the stream channel causing downstream sedimentation, increase the water temperature, lower the water table, and cause the loss of the riparian vegetation altogether.

Beneficial impacts to soils can be expected from implementation of grazing systems which use rest during critical vegetation growing periods and redistribution of grazing away from riparian areas, reservoirs, and other water bodies. Until areas receiving intense livestock use have appropriate grazing systems implemented, soil degradation will continue.

Range improvement construction can cause short-term increases in accelerated soil erosion during the initial disturbance. These range improvements can include mechanical treatments, burning and chemical treatments, fencing, reservoir construction, etc. However, range improvements will help achieve soil stability through better livestock distribution and increased ground cover over the long-term.

While we can describe general impacts, soil specific impacts are difficult to assess since we do not know precisely where most of the activities are going to occur. We do not know, for instance, where the roads and pipelines will be built to service new wells; we do not know where the new wells are going to be either. Consequently, quantifying impacts to soils will be, by necessity, estimated.

Estimates concerning the maximum erosion rates that could occur due to surface disturbing activities have been made in Wyoming. These estimated rates of erosion can be used for the activities that are occurring and can be expected to occur in the CAP area. These estimates have been made based on interpretation and extrapolation of data from specific soils, general field observations, and the literature. While these estimates provide a sense of scale and a basis for comparison of impacts between alternatives, they are not intended to represent actual erosion rates for specific soils.

The soil erosion rates represent a realistic worst case estimate for the year in which the most disturbance takes place. It is assumed that 1/5 of the dis-



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turbance from the range improvements will occur each year for the first 5 years and the highest oil and gas activity in any given year is the amount previously stated. Year to year soil erosion loss has not

been estimated since, in most cases, soil losses will decline depending on local conditions and the rehabilitation success. Table S-1 shows the estimated soil loss per acre caused by the various activities common to the CAP area.

**Table S-1**

### ESTIMATED ACRES OF DISTURBANCE AND MAXIMUM ANNUAL SOIL LOSS BY ACTIVITY

Activity	Acreage of Disturbance/Unit	Maximum Annual Soil Loss (tons per acre per year)
<b>Minerals</b>		
New production well with associated road	3/well	70
Sand and Gravel Mining	11/year	24
<b>Range improvements</b>		
Prescribed Burning/Chemical Treatment		0.5
Mechanical Treatments		2
Reservoir Construction	2/unit	75

Under Alternative A accelerated soil erosion stemming from the activities previously described would amount to an estimated 13,260 tons per year.

This is an average annual rate of about 5.5 tons per acre per year from the disturbed areas. The amount of soil loss attributed to specific activities is presented in Table S-2.

### **Cumulative Impacts**

All surface disturbing activities cause some degree of accelerated erosion to occur particularly when there is little natural ground cover. Accelerated soil movement will continue to occur in the CAP area with the proposed uses. Where pre-

**Table S-2**

### ESTIMATED SOIL LOSS UNDER ALTERNATIVE A

Activity	Annual Acres Disturbed	Soil Loss (tons per year for the highest year)
<b>Minerals</b>		
New production well with associated road	150	10,500
Sand and Gravel Mining	11	260
<b>Range Improvements</b>		
Prescribed Burning/ Chemical Treatments	1,600	800
Mechanical Treatments	623	1,250
Reservoir Construction/ Reconstruction	6	450
<b>TOTALS</b>	<b>2,390</b>	<b>13,260</b>



## ENVIRONMENTAL CONSEQUENCES

disturbance levels of erosion have not been achieved through successful reclamation, the new disturbed sites will add to the erosion that is already occurring. Range and wildlife habitat improvement projects, vegetation treatments, AMP development, improved livestock distribution, and successful reclamation practices that ultimately increase ground cover will have a cumulative long-term beneficial impact on the soil resources.

### Mitigation

Strict adherence to the Guidelines For Surface Disturbing Activities (Appendix A), road closures and avoidance of constructing roads on steep or special management soils, and successful rehabilitation of disturbed areas will minimize the impacts to soils.

### Residual Impacts

Accelerated soil loss will continue on those areas that are not reclaimed or where soil degradation continues due to unrestrained uses.

## N. Air Resources

The largest impact to air quality which would result from the implementation of Alternative A would be those resulting from the development of 300 new oil and gas wells in the study area. Oil and gas wells of this size are small emission sources and do not come under the State of Wyoming prevention of significant deterioration (PSD) regulations for major emission sources. They are evaluated for potential to violate Wyoming Ambient Air Quality Standards, however, by the state air regulatory authority and the Bureau of Land Management in instances where violations would appear possible (e.g., many sources in a location, areas where terrain might adversely impact dispersion of emissions).

Oil wells and well drilling produce emissions from the following:

1. Surface disturbance activities such as grading and wind erosion on unvegetated surfaces.
2. Internal combustion engines associated with drill rigs and support vehicles.
3. Emissions of fugitive dusts emitted from wind erosion on access roads and from entrainment of particulates during vehicle travel on such unsurfaced roads.
4. The burning of small amounts of vegetative matter, mostly brush, on areas which have been cleared for road building and well pad preparation.

5. Small amounts of emissions of hydrocarbons from compressor stations for natural gas pipelines.
6. Small amounts of hydrocarbon, CO<sub>2</sub>, SO<sub>2</sub>, and other emissions from venting and flaring at producing wells in emergency situations only, as pursuant to Wyoming Air Quality Standards, Section 19.

In addition to the oil and gas activities which are proposed under this alternative, prescribed burning would also result in air pollution. Although fires release a variety of emission types (including sulfur dioxide, nitrogen oxides, and hydrocarbons), the only pollutants which are seen as being of significance are particulates. The State of Wyoming requires that BLM conduct analysis of each prescribed burn which includes an estimation of total emissions and if a violation of standards appears likely. Another source of particulate emissions under this alternative is the chaining of vegetation. This activity results in only very limited and short-term particulate emissions which have no probability of violation of standards and are thus analyzed under the total surface disturbance category.

Finally locatable, solid leasable, and other minerals development (such as sand and gravel operations) plus the construction of range improvements also release fugitive dusts in small amounts and are included in the emissions for surface disturbance.

The nature of these sources are so variable that it is impossible to analyze them with accuracy except on a case by case basis. In general, the BLM will require an analysis of air quality impacts from all applicants and not allow activities which violate standards. No individual analysis of these types of sources will be presented for the purposes of the Coordinated Activity Plan.

These emissions do not generally cause violations of air quality standards. Table AQ-1 presents estimates of total emissions which might result from the activities which are proposed in Alternative A. Although these totals may appear to be large quantities, they would be spread over a fairly large area and happen at different times. This would most likely result in not exceeding the applicable air quality standards, except that NO<sub>x</sub> emissions may be high enough in some locations to cause concern for exceeding the NO<sub>x</sub> ambient standard.

Visibility, the optical clarity of the atmosphere, has become of greater importance to the public in the past few years. In the Sublette Basin, many people believe that the atmosphere has become much more hazy. The emission of SO<sub>2</sub>, particulates, and NO<sub>x</sub> into the atmosphere will cause reductions in visibility, especially during days when stagnation of polluted, high humidity air might occur. The magnitude of these events would hinge on the duration of the stagnation episode and the relative humidity.



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**Table AQ-1**

### Air Pollutant Emission for Alternative A

Emission Source	Units	Measure	Pollutant	Amount (tons/yr)
Oil & gas well drilling	32-75	well	TSP or SO <sub>2</sub>	490 to 1,149
Oil & gas well drilling	32-75	well	NO <sub>x</sub>	7,354 to 17,233
Cumulative (yr) oil & gas	—	-NA-	TSP	13,740
Cumulative (yr) oil & gas	—	-NA-	SO <sub>2</sub>	12,377
Cumulative (yr) oil & gas	—	-NA-	NO <sub>x</sub>	186,339
Access road use	950	miles	TSP	21
Surface disturbance	2,367	acres	TSP	108
Prescribed burning	3,800	acres	TSP	24.61
Prescribed burning	3,800	acres	PM <sub>10</sub>	19.7

**Notes:**

1. TSP means total suspended particulate.
2. PM<sub>10</sub> means particulate matter ten microns or less in diameter.
3. NO<sub>x</sub> means nitrogen oxides.
4. Emissions factors used are from those used for well sources in the Riley Ridge project.
5. Prescribed fire emissions were calculated using the BLM Simple Approach Smoke Estimation Model (80% PM<sub>10</sub> ratio to TSP).
6. All emissions presented as ranges are because the implementation of development and activities will vary by year. Emissions and impacts from individual activities will be calculated as more precise information becomes available on a case by case basis.
7. Emission factors for this analysis were taken from the Riley Ridge Air Quality Technical Report. As such, they are probably over conservative because the factors used are for deeper well operations and presumably larger well rig equipment.
8. Cumulative oil and gas emissions were calculated assuming that 1,380 (1,080 existing (10% electric) plus 300 (99 internal combustion pumps) new) wells would be in operation and 32 wells being drilled per year.
9. Access road use was estimated to be 700 miles existing plus 0.5 mile for each new well (using 250 has an estimate). Emissions for TSP were using an emission factor of 43 lbs per mile per year for road average usage. This factor was taken from the Riley Ridge Air Resources Technical Report.
10. Emissions for disturbed acreage were calculated using the USEPA AP-42 emissions factor for agricultural tilling. Assuming that average soil silt content is 25% and Thornthwaites PE index is 31, emissions are 91 lbs. per acre.

Visibility during average conditions (50th percentile values) for the years 1987, 1988, and 1989 has been measured at the Rock Springs District Green River visibility site as 163 KM as standard visual range (the range at which a person with good vision can detect a contrast between a dark terrain feature and the sky). Using a simple box modeling approach developed by Lattimer and Associates (1990) to conservatively assess changes to visibility, the emissions planned under this alternative could reduce visibility to 93 kilometers or cause a 43% reduction in visual range during a 48-hour plus stagnation event (with 600 meter mixing height) having an average relative humidity of 70%.

Although, the figures presented are extremely conservative, this level of oil and gas development could

result in substantial visibility reductions in areas of the Sublette Basin. This reduction would not cause visibility related accidents (e.g., traffic). It would, however, have reasonable probability of reducing recreation enjoyment for some activities (such as scenic photography) during stagnation events in the basin. At present, no State or Federal regulations apply to this type of visibility change in Clean Air Act Class II areas such as the Sublette Basin.

### Cumulative Impacts

Cumulative impacts to air resources in the CAP area will be in two areas: (1) small contributions to general reductions in air quality for pollutants such as particulates (total suspended and particulate



## ENVIRONMENTAL CONSEQUENCES

matter 10 microns and less in diameter), sulfur dioxide, and nitrogen dioxide; and (2) changes to visibility (atmospheric clarity) in the area. The absolute concentrations of pollutants in the atmosphere resulting from the cumulative emissions from prescribed burning, minerals exploration, and agriculture activities cannot be estimated fully at this time. Under Alternative A, no violations of State or Federal ambient air quality standards are anticipated. Due to the large amount of uncontrolled emissions from oil and gas development, there is potential for visibility to be reduced in the CAP area and other areas of the Sublette Basin.

### Mitigation

Mitigation measures for air resources under Alternative A would include the stabilization of all exposed land surfaces to prevent wind erosion, conduction of prescribed burning under good or excellent dispersion conditions only, and reducing the amount of nitrogen oxide emissions in the area by requiring that the number of internal combustion engines used for pumping and other activities related to oil and gas exploration be reduced. In addition, stipulations on road maintenance, crushing, and hauling of minerals products can be instituted to reduce particulate emissions (e.g., road surfacing and watering, conveyor covering, haul truck covering, and the like).

Finally, the Rock Springs District can do much to improve air quality in the CAP area by maintaining its strong partnership with the Wyoming DEQ Air Quality Division; providing whatever local support to the Division's goals and activities it can, providing technical and environmental information to the Division; and developing coordinated studies and goals with the Division, USFS, Western Wyoming Community College, industry, and other local parties.

### Residual Impacts

With present day technology, it is not possible to reduce air emissions to none for any activities where fossil fuels are produced or consumed. This is especially true for carbon dioxide emissions which are believed to have potential for exacerbating global warming. No matter what mitigation measures the BLM may take to protect air resources, carbon dioxide emissions will not be reducible if fossil fuels are used to power vehicles, compressors, heavy equipment, drill rigs, and other equipment. Due to the high level of existing oil and gas development in the CAP area and the Sublette Basin, generally, it would not be possible to reduce existing emissions substantially under the extent of BLM authority.

### O. Watershed

**Surface Water** - The activities that affect soils and ground cover will also affect surface water. Surface disturbing activities and vegetation removal or enhancement will change the quantity and quality of water and timing of water flow emanating from the CAP area. Whenever vegetative cover is reduced or removed, surface runoff increases, peak flows increase, and water quality deteriorates due to increased sedimentation.

If vegetative changes occur over a large area, seasonal fluctuations in water discharge may also occur. For example, the removal of vegetation increases stream flows during storm events and reduces stream flows during dry periods.

The most apparent impact on water resources from the surface disturbing activities would be the deterioration of water quality from increased sedimentation. This would be attributed to the erosion that would occur on the CAP area. The percentage of eroded soil in a watershed that reaches its stream channel is the sediment delivery ratio. Sediment delivery ratios are highly variable and complex and are influenced by the physical features and hydrologic characteristics of the drainage basin. These features include: nature and location of the sediment source; texture of eroded soil; location of depositional areas; drainage area; slope; stream channel density; and precipitation amount, intensity, and distribution. Sediment delivery ratios for the CAP area range from approximately 3-10%. However, for the sake of impact analysis, a reasonable sediment delivery ratio for the CAP drainage area as a whole would be 5%.

The CAP area is within the Colorado River Basin. Salt loading of the tributaries of the Colorado River is a major concern for the basin States. There are approximately 35,400 acres (18%) that are considered to be moderately saline. There are also small localized areas of soils that are strongly saline that represent less than 1% of the CAP area. The majority of the remaining soils are only slightly or nonsaline. The moderately saline soils can contribute up to 10 pounds of salt per ton of sediment delivered to a stream.

The disposal of produced water from the oil and gas operations in the CAP area is done through water injection or discharged into lined and unlined pits. It is estimated that 20% of the produced water is disposed of into water injection wells with the remaining amount into the pits. Any produced water that may be discharged into a surface drainage must meet the water quality standards of the National Pollution Discharge Elimination System (NPDES), which is administered by the Wyoming DEQ.



## ENVIRONMENTAL CONSEQUENCES

Under Alternative A, total suspended sediment loads in the Green River could increase by 1.8% (663 tons per year). Salt loading from this sediment could add up to .6 tons of salt per year to the Colorado River system.

**Groundwater** - Degradation of groundwater can occur primarily through drilling activities. Drilling wells through water and oil bearing formations can cause contamination of fresh water by introducing oil and high concentrations of salts. Oil and gas bearing formations are often trapped under very high pressures between other impervious layers.

The oil or gas is also frequently accompanied by a much larger volume of saline water. When the high pressure zone is pierced during drilling, problems may occur in controlling the pressure. The saline water may migrate up the outside of the casing or along bedding planes to a zone of lower pressure which contains fresher water. During operation of the well field contamination can occur through poorly cemented or corroded well casings.

Disposal of produced water by injection has the potential to contaminate fresh water aquifers in much the same way as described above in the discussion on oil and gas wells. Many times, producing wells or dry holes are converted to injection wells. If these wells are not properly completed, problems may arise. Water is injected under pressure; therefore, it is necessary to properly engineer the injection according to the injection aquifer's characteristics. The State Oil and Gas Commission also approves all new and converted injection wells. Approval includes pressure testing and all requirements under Rule 320, General Drilling Rules. An aquifer exemption is also required which ensures that fresh water aquifers are not used for injection. These requirements have proved sufficient in protection of fresh water by injection.

The degree of freshwater aquifer contamination can not be quantified at this time due to the lack of information available on these kinds of failures. Drilling mud and additives used in the well drilling process could contaminate shallow alluvial aquifers if the reserve pits leak.

The same can be said about the pits used for produced water. The impact would depend on the extent of the intrusion into the aquifers, the nature of the drilling fluids or produced water, and the characteristics and uses of the aquifer. The probability of this impact would depend on the design and construction of the reserve pits. Of course, as more pits are built due to increased activity, the probability of contamination can increase as well.

The lack of groundwater information has been identified. As a result of this data gap groundwater

monitoring of the CAP area has been proposed to determine what impacts, if any, are occurring.

### Cumulative Impacts

#### Impacts to Surface Water

Due to the geology of the CAP area, natural sedimentation has always occurred. The proposed uses in the CAP area will add more to the system. This, in turn, will add to the salt loading of the Colorado River system. The amount of salt originating from the CAP area, however, is small in terms of the massive input from other areas downstream and the total salt load the Colorado River carries. Where predisturbance levels of erosion have not been achieved through successful reclamation, these sites will continue to contribute sediment and salt to the system. Range and wildlife habitat improvement projects, vegetation treatments, AMP development, improved livestock distribution, and successful reclamation practices that ultimately increase ground cover and streambank stabilization will have a cumulative long-term beneficial impact on the water resources.

#### Impacts to Groundwater

Impacts to groundwater are unknown due to the lack of groundwater information. Monitoring of the CAP area has been proposed to determine what impacts, if any, are occurring.

### Mitigation

Strict adherence to the Guidelines for Surface Disturbing Activities (Appendix A), road closures, avoidance of constructing roads on steep or special management soils, and minimizing stream crossings will reduce the impacts to water.

### Residual Impacts

Surface water degradation will continue where sediment is delivered to the stream from unreclaimed sites or where accelerated soil erosion is occurring due to unrestrained uses.

### P. Reclamation

Reclamation efforts have ranged from none on older sites to an inconsistently successful effort on more recent disturbances. Levels of success differ as a result of three variables. These variables include weather and precipitation patterns; poor planning and design; and lack of implementation of the reclamation plans.



## ENVIRONMENTAL CONSEQUENCES

Conducting concurrent reclamation will increase success on all future disturbances being reclaimed. The affects that anticipated improvement, in reclamation success, will have on other resource values is described in the impact analysis of each of those resources. This section will only address the likelihood of reclamation success for the projects proposed in the CAP.

There arise numerous difficulties when reclaiming old disturbances. These include the lack of viable topsoil salvaged, potential for contaminated soils, difficulty contouring, steep slope, lack of fill materials, and difficulty in protecting some areas from grazing/browsing impacts.

These difficulties will result in a general lack of reclamation success on the older areas of disturbance scheduled for reclamation. Although the reclamation efforts on these areas will be more difficult than reclamation on newer disturbances, some degree of success will result.

Implementation of the procedures described in the CAP will generally improve the level of reclamation success on recently disturbed sites. The guidelines specify areas that will be avoided or mitigated before or during the construction process.

Compliance with the reclamation goals and objectives will improve conformance with the reclamation plan. Reclamation plan requirements will serve to improve the mutual understanding of all parties involved regarding detailed reclamation efforts. Plans, carefully complied with, will serve to improve reclamation success in the CAP area.

An active reclamation monitoring program will enhance both short-term success and long-term ecosystem reconstruction of the reclaimed area. However, monitoring is effective only when there exists total commitment to properly maintain and manage the reclaimed area in conformance with the recommendations made during the monitoring process.

### Cumulative Impacts

Reclamation of existing disturbances in conjunction with concurrent reclamation on new disturbances will result in accelerated secondary succession and stabilization of disturbed areas. Recommendations for specific reclamation strategies and a detailed set of evaluation criteria are discussed in the appendices.

### Mitigation

Each operator and permittee will be required to submit a site-specific reclamation plan with the Notice of Intent to Abandon (NIA) for each well and associated facility or right-of-way abandonment request.

### Residual Impacts

Analysis has not indicated any residual impacts.

### Q. Forestry

The proposal to harvest 70 acres of a 316-acre multi-aged Douglas-fir stand would result in some vegetative disturbance. Since much of the stand will be "individual tree harvested," the area will retain a forest aspect. Some weeds will probably invade the disturbed area initially, however natural plant succession will commence and a stocking of seedlings is expected to occupy the site within 15 years.

A comparison of Alternatives along with key resource elements can be found in the Summary Table found at the end of this Chapter.

### Cumulative Impacts

Impacts that would result from the proposed 77 acres of selective harvesting on the Hogsback include: an estimated 25-30% reduction in wildlife escape, hiding, and thermal cover on those acres actually harvested; some disruption to oil and gas related traffic flow over the narrow, winding roads currently in use on the Hogsback; and a slight increase in airborne particulate resulting from logging equipment movement.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.



### **II. ALTERNATIVE B - CAP Based on Amending the Pinedale RMP Decisions to Limit Restriction of Oil and Gas Exploration and Development Activities to a Maximum of 60 Days, to Limit Relocation a Maximum of 200 Meters, and to Allow No Provision for Off-Lease Siting of Operations.**

Alternative B would amend the decisions in the Pinedale RMP for oil and gas exploration and development restrictions based on the oil and gas industry's interpretation of the provisions of 43 CFR 3101.1-2.

Under this alternative, it is assumed that 600 new wells would be drilled in the study area over the next 10 years. This anticipates that a majority of the area would be developed at 80-acre spacing during this period. The remaining 500 wells would be drilled at the rate of about 55 per year over the next 9 years. Two hundred (200) wells would also be reclaimed during the 10-year period. For more information, refer to Chapter II, Alternative B.

#### **A. Socioeconomic**

Under this alternative drilling would be restricted for not more than a total of 60 days during any 12-month period. The period during which such restrictions might occur would be from November 15 through July 31. Therefore, for purposes of this analysis it is assumed that 305 days of the year are open to drilling. This alternative estimates that 600 wells will be drilled over the 10-year period with 100 drilled the first year and 55/year drilled over the following 9 years. It also stipulates that 200 wells will be reclaimed over the 10 years.

Drilling 100 wells the first year - To complete 100 wells in this time period would require about 7 drilling rigs and 10 completion rigs working full-time. This translates into approximately 190 rig workers, slightly less than the number of drilling workers estimated to have been working in 1989. It is estimated that about 100 of the rig workers are local residents and 90 are nonresidents. Therefore, it is estimated that temporary housing needs of rig workers would be about equal to those of 1989. Expenditures within the local area would be slightly lower than in 1989.

Drilling 55 wells per season for 9 years - This scenario assumes that the oil/gas companies will drill 55 wells during the 305-day season. Based upon the assumption of 15 wells/year for each drilling rig and 10 per year for each completion rig, it would require 4 drilling and 6 completion rigs to drill 55 wells in this time period. The workers needed to man these rigs would total about 110, just over ½ of the workers estimated for 1989. It is estimated that 100 of the workers are local residents and 10 are nonresidents. Thus, temporary housing needs by rig workers would be at a minimum under this scenario during years 2 through 10.

In summary, this scenario would result in direct income to the local area over the 10-year period of approximately \$236.2 million from oil/gas activities, plus \$5 million to local businesses to reclaim and plug the 200 old well sites for a total of slightly over \$241 million.

The socioeconomic analyses for resources other than oil and gas are included in each alternative within the specific resource sections.

#### **B. Oil and Gas**

Under Alternative B, BLM will implement the decisions in the Pinedale RMP with the exception of applying the revised 43 CFR 3101.1-2 regulations. The relevant part of 43 CFR 3101.1-2 says, "At a minimum, measures shall be deemed consistent with lease rights granted provided that they do not: require relocation of proposed operations by more than 200 meters; require that operations be located the leasehold; or prohibit new surface disturbing operations for a period in excess of 60 days in any lease year." It would only apply to the 370 leases within the CAP that do not contain special stipulations. The regulatory measures could also be applied to an APD where and when appropriate.

Development in the area will be 600 wells on 80-acre spacing over the 10-year period. One hundred wells would be drilled the first year with 55 wells drilled each year for the remaining 9 years. Two hundred wells would also be reclaimed over the 10-year period. Only those elements that differ from Alternative A are discussed.

These measures provide for less restrictive seasonal and relocation measures to be imposed on oil and gas development proposals. The surface disturbance constraint will allow a well location to be moved no more than 200 meters (656 feet) for the protection of any other resource values. Seasonal protection delays cannot exceed more than 60 days in any lease year. Although timing impacts to oil and gas activities could occur during construction or drilling, the impacts would be minimized by requiring the delays to occur before construction, before drilling, or



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before completion so there would be no interference during an actual phase of activity.

It is conceivable that a company could lose more than 60 days if the delay was at the end of a lease year. A worst case scenario would be if a company is shutdown before drilling for 60 days towards the end of the lease year and then constrained another 60 days in the new lease year. It could be very costly if a rig is on standby waiting to move on a site to begin drilling or completion operations. However, the likelihood of a company keeping a rig on standby is remote.

Drilling 600 wells in 10 years versus 300 wells in 10 years as in Alternative A poses similar impacts to the oil and gas industry. Seasonal restrictions are lessened so there is more drilling time allowing oil and gas companies to better react to sudden changes in demand. If the economics for oil and gas were such as to increase drilling activity in this field, it is probable other fields in Wyoming would see an increase in drilling also, but the rig and worker availability would impact the number of wells that could be drilled and completed the first year.

If in 1 year, 20-30 new wells are drilled, one additional full-time employee must be added to the field crew to check production facilities. If 50-60 new wells are drilled and completed, then two field employees will have to be hired with one relief employee. Ten to 12 new people would require the company to add one administrator. In the next 3-5 years, Enron plans a 30-50 well drilling program and will be adding 6-9 full-time employees. If each company in the Big Piney-LaBarge field increases their operations, then each company will need additional crews and equipment. The crews will need housing and food supplies. These impacts are more completely discussed in the socioeconomic section of this assessment. Under this alternative, the time table of the activity from 300-600 wells would impact the service industries due to the demand placed on them for rigs, pipe, and production equipment. There is one steel factory in the U.S. that can make drill stem pipe. Additional pipe would have to be imported from Japan at an increased cost. Presently in Sublette County eight out of 14 rigs are in storage. Forty-four percent of the current drilling activity in the Rocky Mountain region is taking place at a range of depths common to the depths drilled in the CAP area.

The ability to do additional drilling from Alternative A would allow additional production of 100-350 mmcf/gpd over the 10-year period (100 additional wells x 1 to 3.5 mmcf/gpd per well). This additional production would allow increased royalties of \$23,000-\$80,500 per day over the 10-year period (.23 per mcf x 1,000 x 100 mmcf/gpd; .23 x 1,000 x 350 mmcf/gpd). The increased production will also affect the Opal Gas Plant. Presently, the gas plant is pro-

cessing 250 mmcf/gpd and has the capacity for processing 425 mmcf/gpd. If an additional 100 wells are drilled and produced the first year, this will add 100-350 mmcf/gpd. If the top end of the production (350 mmcf/gpd) is added to the present gas plant level of processing (250 mmcf/gpd), the gas plant would have to expand to take care of the excess mmcf/gpd over and beyond the gas plant processing capacity of 425 mmcf/gpd.

### Cumulative Impacts

Alternative B emphasizes the development of gas resources in the CAP area. This would result in a significant increase in total field production and capability to meet market needs and a more thorough drainage of the hydrocarbon reserves in the area.

The development of gas resources would also increase the revenues to the Federal Government, State, county, and local people through increased royalty payments, additional personal buying power, and taxes.

The cumulative effects to the oil and gas companies will be similar to those in Alternative A. The companies will still experience some timing and location restrictions. There will still be delays in getting a well on-line, but they will be much less than in Alternative A and will not be a big impact.

The 3101 regulations will allow protection of the resources along with the development of the field.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## C. Wildlife Habitat

Alternative B differs from Alternative A primarily in the way minerals program activities are regulated and the way the other resources respond to the minerals program actions. Alternative B proposes twice as much mineral development activity as Alternative A and allows less opportunity for incorporation of wildlife considerations in minerals actions. The nature of the impacts to wildlife in this alternative are the same as Alternative A, although the magnitude of the impacts vary.



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### Cumulative Impacts

From a wildlife standpoint, this alternative is less desirable than Alternative A. Generally speaking, wildlife deaths were estimated to be about 10% greater for all major species and groups than in Alternative A. There were more animals displaced in this alternative than in Alternative A and this impact, in turn, compounded the habitat degradation situation. The amount of habitat lost or degraded in this alternative runs from 2-4 times greater for all species (particularly deer and antelope). The limitations on the use of surface protection stipulations in this alternative reduces the effectiveness of this avenue of environmental protection by about 70%. The chance of degradation to aquatic/fisheries habitat about doubles. The limitations on the use of protective stipulations in this alternative are probably the single most significant impacting factor, and leads to the greatest resulting adverse impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

The nature of the residual impacts in this alternative are the same as for Alternative A; though the magnitude may vary.

Even after the somewhat limited environmental protective measures of this alternative are applied, there will still be animals killed and displaced as a result of management activities. Accidents, vandalism, and poaching will continue to occur, and habitat acreage will still be permanently lost to development and use. In this alternative, these residual adverse impacts will probably be about 2-3 times greater than in Alternative A.

### D. Livestock Grazing Management

The proposed development level in this alternative would result in 5,109 acres and 352 AUMs affected in the short-term, and 4,299 acres and 296 AUMs would be lost for between 30 and 90 years. Road hazards to livestock are expected to increase under this alternative.

### Cumulative Impacts

Cumulative impacts, mitigation measures, and residual impacts would be the same as under Alter-

native A except that approximately 4,299 acres and 296 AUMs would be lost for up to 90 years.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

### E. Vegetation

The proposed development level in this alternative would disturb 5,109 acres in the short-term and 4,299 acres in the long-term. All other impacts would be the same as alternative A.

### Cumulative Impacts

Cumulative impacts would be the same as under Alternative A except that approximately 4,299 acres would remain in a disturbed state for up to 90 years.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

### F. Recreation

It is estimated by recreation and wildlife specialists that the increase in the amount of surface disturbance under this alternative would decrease antelope numbers in the area. This subsequently would lead to a decrease in the CAP area of 250 antelope hunter days, annually. The hunter day value for this recreational activity is estimated to be \$100 in Wyoming. Applying this value to the 250 hunter day decline would result in a decrease of \$25,000 annually in the value of recreation under this alternative. As stated in the Affected Environment, Socioeconomic Section, the value of antelope hunter days in the CAP area is currently estimated at between \$40,000 and \$50,000 annually. The alternative is not



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estimated to affect other recreational activities in the CAP area.

### Cumulative Impacts

The cumulative effect of this alternative would be as stated above - a loss of an estimated 250 visitor days of antelope hunting.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## G. Cultural Resources

With twice the number of oil and gas wells planned than under Alternative A, greater disturbance to cultural resources can be expected.

### Cumulative Impacts

Greater disturbance to cultural resources can be expected from vandalism, looting, and other direct and indirect impacts. By restricting surface disturbance activities to within only 200 meters, or visual horizon (whichever is closer) for historic trails, increased looting, vandalism, and artifact collecting can be expected in these areas. Increased inventory, evaluation, and data recovery efforts will result in increased knowledge of the cultural resource data base.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## H. Paleontology

With twice the number of oil and gas wells planned than under Alternative A, greater disturbance to fos-

sils can be expected from vandalism, looting, and other indirect impacts.

### Cumulative Impacts

By restricting surface disturbance activities to within only 200 meters, or visual horizon (whichever is closer) for historic trails, increased looting, vandalism, and fossil collecting can be expected in these areas.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## I. Transportation

An increase in 150 miles of road (22%), 50 miles of powerlines (25%), and 150 miles of pipeline (15%), will occur as a result of planned mineral development in the CAP area.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## J. Visual Resources

Since the current guidelines described under 43 CFR 3101.1-2 will not be mandated in permitting each of the APDs, the overall impact of an increase in 600 wells and associated roads, six new mineral materials pits, plus development of additional support systems during the next 10 years will moderately impact the visual resources of the CAP area.



## ENVIRONMENTAL CONSEQUENCES

There will be a substantial increase in activity levels and amount of surface disturbance in the CAP area. The relative density and distribution of development will change the visual characteristics of the area.

Depending upon the distribution of new facilities, the implementation of this alternative will reduce approximately 10,530 acres of VRM Class IV areas to Class V. It will reduce approximately 340 acres of VRM Class III areas to Class IV.

### Cumulative Impacts

Implementation of Alternative B will moderately impact the visual resources of the CAP area.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## K. Lands and Realty

With well development doubling from the levels described for Alternative A, the right-of-way demands for roads and ancillary facilities associated with oil and gas production are expected to increase under this alternative. Right-of-way applicants will face delays in obtaining rights-of-way because of BLM's inability to accommodate the increased workload. BLM's right-of-way processing costs will increase due to the anticipated workload, and on-the-ground compliance will suffer under this alternative.

Current BLM staffing levels could not efficiently accommodate the increased right-of-way processing under this alternative.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## L. Salable Minerals

Under this alternative, the depletion rate of the six existing mineral material pits will increase twofold over the depletion rate in Alternative A. This equates to a reduction of mine life from 15 years to 7½ years.

If this alternative is implemented, BLM may have to designate 6 new mineral material pits to handle the increase in demand to ensure that supply continues to meet the demand.

The new mineral material pits will cover approximately 120 new acres. The 120 acres disturbed will decrease the animal habitat for approximately 10-20 years; however, it will minimally reduce the animal and livestock AUMs for that time period. While the new mineral material pits are being developed, reclamation would be occurring on the depleted pits, but reclamation would take 3-5 years for vegetation to return to its previous productivity level.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## M. Soils

Under Alternative B accelerated soil erosion would amount to an estimated 23,760 tons per year. This is an average annual rate of about 9.4 tons per acre per year from the disturbed areas.

This represents a 79% increase in erosion over Alternative A. This change is attributed to the increase in oil and gas activity. The amount of soil loss attributed to specific activities is presented in Table S-3.



## ENVIRONMENTAL CONSEQUENCES

**Table S-3**  
**ESTIMATED SOIL LOSS UNDER ALTERNATIVE B**

Activity	Annual Acres Disturbed	Soil Loss tons per year (for the highest year)
<b>Minerals</b>		
New production well with associated road	300	21,000
Sand and Gravel Mining	11	260
<b>Range Improvements</b>		
Prescribed Burning/ Chemical Treatments	1,600	800
Mechanical Treatments	623	1,250
Reservoir Construction/ Reconstruction	6	450
<b>TOTAL</b>	<b>2,540</b>	<b>23,760</b>

### Cumulative Impacts

Cumulative impacts to soils are expected to be higher than in Alternative A due to increased surface disturbance. Refer to Alternative A's cumulative impacts.

### Residual Impacts

Analysis has not indicated any residual impacts of a significant level.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

## N. Air Resources

Air quality impacts for Alternative B would increase over Alternative A due to increased emphasis on oil and gas development. Table AQ-2 depicts the air pollutant emissions which might result from this alternative.

**Table AQ-2**  
**Air Pollutant Emission for Alternative B**

Emission Source	Units	Measure	Pollutant	Amount (tons/yr)
Oil & gas well drilling	43-100	well	TSP or SO2	659 to 1,532
Oil & gas well drilling	43-100	well	NOx	9,881 to 22,980
Cumulative (yr) oil & gas	—	—	TSP	14,888
Cumulative (yr) oil & gas	—	—	SO2	13,441
Cumulative (yr) oil & gas	—	—	NOx	202,341
Access road use	1,200	miles	TSP	26
Surface disturbance	2,517	acres	TSP	115
Prescribed burning	3,800	acres	TSP	24.6
Prescribed burning	3,800	acres	PM10	19.7

**Notes:** Same as Alternative A.



## ENVIRONMENTAL CONSEQUENCES

Cumulative oil and gas emissions were calculated assuming that 1,580 (1,080 existing (10% electric powered) plus 500 (130 internal combustion pumps) new) wells would be in operation and 43 wells being drilled per year.

Access road use was estimated to be 700 miles existing plus 0.5 mile for each new well (using 500 as an estimate). Emissions for TSP were using an emission factor of 43 lbs. per mile per year for road average usage. This factor was taken from the Riley Ridge Air Resources Technical Report.

The emissions planned under this alternative could reduce visibility to 88 kilometers or cause a 46% reduction in visual range during a 48-hour plus stagnation event (with 600-meter mixing height) having an average relative humidity of 70%.

### Cumulative Impacts

Cumulative impacts for this alternative will be much the same as for Alternative A except that the increased oil and gas development will increase impacts to air quality in general and visibility in particular. Since the new proposed development will utilize technology which would result in less emissions than older, existing methods, the overall impact to air quality would not be much different than under Alternative A.

### Mitigation

The BLM proposes that a study on the potential impacts to air quality/visibility in the Sublette Basin from minerals activities be instituted. Visibility impacts and air emissions in the CAP area resulting from oil and gas activities are overestimated for safety considerations in this document. However, the potential for impacts should be investigated as a cooperative effort by the BLM, industry, State environmental officials, and other officials to ensure accuracy of findings.

### Residual Impacts

Analysis has not indicated any residual impacts.

### O. Watershed

Under Alternative B, total suspended sediment loads in the Green River could increase by 3.3% (1,188 tons per year). Salt loading from this sediment could add up to 1.1 tons of salt per year to the Colorado River System.

### Cumulative Impacts

#### Impacts to Surface Water

Cumulative impacts to water are expected to be higher than in Alternative A due to increased surface disturbance. Refer to Alternative A's cumulative impacts for further discussion.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

### P. Reclamation

Same as Alternative A.

### Q. Forestry

Same as Alternative A.

## III. ALTERNATIVE C - CAP Based on Amended Pinedale RMP Decisions that Shorten Seasonal Wildlife Restrictions and Reduce the Area of Use of Seasonal Restrictions in Crucial Winter Ranges.

Alternative C would amend the decisions in the Pinedale RMP as follows: seasonal restrictions for wintering mule deer and antelope would be reduced by 45 days (December 15 - April 15), and for breeding and nesting sage grouse would be reduced by 75 days (March 15 - June 30), with provisions for extension; seasonal stipulations (COAs) for crucial mule deer and antelope winter range will be applied to the entire area of designated crucial winter range on public lands except heavily used highway corridors, the base camps established in the area for industry use, and private and State owned lands. It



## ENVIRONMENTAL CONSEQUENCES

would provide for protection of big game, sage grouse, and raptors and their habitat through consultation with industry, WGFD, and other interested parties if a longer seasonally restrictive period were needed.

Under this alternative, it is assumed that 600 new wells would be drilled in the study area over the next 10 years. This anticipates that a majority of the area would be developed at 80-acre spacing over the next 10 years. 100 wells would be drilled the first year. The remaining 500 wells would be drilled at the rate of about 55 per year over the remaining 9 years. Two hundred (200) wells would also be reclaimed during the 10-year period.

### A. Socioeconomic

This alternative assumes that 600 wells will be drilled in the 10-year period at the rate of 100 the first year and 55/year for the next 9 years. It also stipulates that 200 well sites will be reclaimed during the 10 years. It further stipulates that in a worse case situation there would be no surface use from December 15 to April 15 of any year within mule deer and antelope winter range, and no activities or surface use from March 15 to July 31 in areas needed to protect game birds and raptors.

Although exceptions may be granted under this alternative, their frequency and nature are not predictable. Therefore, it is necessary to consider three scenarios to show potential impacts for various drilling season timeframes.

1. A worst case situation for oil and gas where the entire area is restricted to drilling from December 15 through July 31 (228 days). The drilling season would be 137 days.
2. Drilling in the entire area is restricted from December 15 to April 15 (121 days) with exceptions possible during the April 15 through July 31 period. The drilling season would be 244 days.
3. Exceptions and mitigation measures are possible through out the entire December-July restriction period, allowing drilling to proceed as long as the well being of wildlife is not adversely impacted. This assumption estimates a drilling season of 305 days. This scenario assumes that drilling would not be undertaken by oil/gas companies during the severe winter months of January and February.

Each of these scenarios provides the local area with over \$230 million over the 10-year period, and all would place heavy demands on local temporary housing during the first year of the 10-year period. Scenario 1 would also approach or exceed the limits of available temporary housing in the local area during years 2 through 10.

Scenario 1 is a virtually impossible scenario because it assumes all 600 wells in the CAP area would have nesting birds in the immediate vicinity of the proposed well pads and, subsequently, be subject to seasonal nesting restrictions. Historically, less than 5% of all permitted wells have actually been delayed due to nesting birds.

Scenario 2 is the closest to what actually would be expected to occur in the CAP area under this alternative. However, it assumes that the entire CAP area and the 600 wells would be subject to the critical deer winter range drilling restrictions. In fact, not more than 70% of the CAP area is regarded as crucial deer and antelope winter range and, under this alternative, less than 65% of the area would be deer and antelope winter range subject to winter drilling restrictions. Therefore, wells could be drilled in 35% of the CAP area year-round.

Scenario 3 is overly optimistic. While exceptions to various restrictions could be granted under applicable conditions, these exceptions are not assured. Therefore, all work should be scheduled for completion prior to November 15.

**Scenario 1** - This scenario assumes one rig could drill about 7 wells/season and one completion rig could complete about 5 wells/season.

Drilling 100 wells the first year - To drill 100 wells in the CAP area during the first year of the 10-year period under this scenario would require 14 drilling and 20 completion rigs working full-time. This would create the need for about 380 rig workers to man the 34 rigs. This is about 90% above the number of rig workers estimated for 1989. Since there are about 100 rig workers who are local residents in the CAP area, at least 280 of the required workers would be nonresidents who would require temporary housing. Since temporary housing is very difficult to obtain when the total of nonresident rig workers approaches 100, it is assumed that 280 workers seeking temporary housing for 137 days would highly tax the availability of such housing in the local area. Contractors would have to provide more mancamp facilities than they currently provide.

It would not be economical for the local communities to construct additional temporary housing to meet the needs of these non-residents because in the following years drilling activity is not expected to be above 55 wells/season.

This level will require a substantially smaller number of rig workers per season than does the 100 wells/season level. Even if companies were to drill 100 wells every year in this timeframe, local communities would hesitate to build more temporary housing as it would result in an excess housing capacity for most of the year.



## ENVIRONMENTAL CONSEQUENCES

Drilling 55 wells for 9 years - It would require about 8 drilling and 11 completion rigs to drill 55 wells in the 137 day season. These 19 rigs would require an average of 215 rig workers, or slightly more than the number estimated for 1989. About 115 of these would be nonresidents.

If contractors were providing housing for nonresident workers, expenditures might be made to local landowners for locating mancamps. This is estimated to be much less than expenditures that workers would need to make to the local area to acquire their own housing, if such housing were available. As stated earlier, housing is virtually filled to capacity by the time nonresident rig workers total 100.

Direct income to the local area from oil/gas well drilling and related activities over the 10 years would total slightly over \$231 million. Reclaiming and plugging 200 abandoned wells during this period would add another \$5 million for a total of approximately \$236 million.

**Scenario 2** - This scenario assumes that drilling in the CAP area is restricted during December 15 to April 15 (121 days), leaving 244 days per season for drilling wells. It assumes that exceptions to the April 15 to July 31 period can be acquired if needed. It also assumes that 1 drilling rig can drill 12 wells/season in this 244-day period and 1 completion rig can complete 8 wells/season.

Drilling 100 wells the first year - To drill 100 wells in the CAP area during the first year of the 10-year period under this scenario would require 9 drilling and 13 completion rigs. These 22 rigs would require about 245 rig workers, which is almost  $\frac{1}{4}$  higher than the estimated 1989 rig worker total. It is estimated that 145 would be nonresidents requiring temporary housing during the drilling season.

Drilling 55 wells for 9 years - This scenario would require 5 drilling rigs and 7 completion rigs to drill 55 wells per season. These 12 rigs would require 135 workers. This is about  $\frac{3}{4}$  the level of rig workers estimated for 1989. Of these, 35 are assumed to be nonresidents; so, the need for temporary housing is substantially less than in 1989.

Direct income to the local area from oil/gas drilling and related activities over the 10-year period would total about \$234.3 million. An additional \$5 million from reclaiming and plugging the 200 wells would also be paid out to local businesses over the 10-year period, bringing the total to over \$239 million.

**Scenario 3** - Under this scenario, exceptions and mitigation measures are possible through out the entire December-July restriction period, allowing drilling to proceed as long as the well being of wildlife is not affected. This results in a potential drilling

season of 305 days, assuming that companies would not be drilling in the severe winter months of January and February. It is estimated that drilling rigs can drill about 15 wells/season and completion rigs complete about 10 wells/season in this time period.

Drilling 100 wells the first year - Drilling 100 wells the first year would require 7 drilling rigs and 10 completion rigs working full-time. This would require 190 rig workers of which 90 are assumed to be nonresidents.

This is slightly lower than the number of rig workers estimated for 1989. Therefore, the need for temporary housing by these workers would be about as great as in 1989.

Drilling 55 wells per season for 9 years - It is estimated that drilling 55 wells in this timeframe would require 4 drilling and 6 completion rigs working full-time. These 10 rigs would require about 110 rig workers, about 90% less than the 1989 total. They would be mostly local residents who would not require temporary housing.

Direct income over 10 years is approximately \$236.2 million from oil/gas drilling activities. Reclaiming and plugging 200 wells over the 10 years would add another \$5 million, for a total of over \$241 million.

This scenario and Alternative B would provide basically the same level of income to the local area over the 10-year period.

The socioeconomic analyses for resources other than oil and gas are included in each alternative within the specific resource sections.

## B. Oil and Gas

The drilling window is extended in this alternative allowing more wells to be drilled and completed. The drilling and completion window is 245 days. If 100 wells are to be drilled and completed in the first year, 8 drill rigs are needed (compared to 10 rigs in Alternative A and 7 rigs in Alternative B) and 13 completion rigs (compared to 15 in Alternative A and 10 in Alternative B) are needed. If there was an exception approved to allow a shutdown when a rig (drilling or completion) is held on standby, the industry would be economically impacted due to the rig standby costs.

Similar impacts would occur under this alternative as in Alternative B with the shortage of drilling equipment, personnel, and production equipment. Oil and gas companies will still have to develop a well-planned drilling program to avoid some of the timing and shortage impacts. Royalties gained from additional drilling would be similar to those in Alternative B. Refinery impacts and employment impacts are again like those in Alternative B.



## ENVIRONMENTAL CONSEQUENCES

There is another impact to consider as the drilling season gets smaller and the number of wells get higher. The seasonal restriction demands that more rigs drill simultaneously. The result, besides the socioeconomic impacts discussed in that section of this document, is that quality control may suffer. If a drilling foreman is forced to have a greater number of rigs drilling simultaneously, the opportunity for close supervision of the operations is less and the change for mistakes and accidents is increased. While this loss of quality control is not likely to manifest itself as a total loss of a well, there is the possibility that a well will cost more and be less productive. Road closures or travel limitations should be coordinated with the oil and gas industry along with the WGFD to avoid any impacts to the industry. Coordination will allow industry to better plan their exploration and development activities and lower the impacts.

### Cumulative Impacts and Residual Impacts

Same as Alternative B.

### Mitigation

Mitigation measures for oil and gas would include improved reclamation plans so the reclamation success can improve substantially.

### C. Wildlife Habitat

Alternative C differs from Alternative A mostly in the manner that the minerals program activities are regulated and the way the other resources respond to the minerals program actions. Alternative C proposes twice as much mineral development activity as Alternative A, and shortens the seasonal protective stipulations for mule deer, antelope and sage grouse. It further allows for a slightly reduced area (about 14,500 acres) of regulatory protection of deer and antelope crucial winter ranges from mineral development activities. The nature of the impacts to wildlife in this alternative are the same as Alternative A, but the magnitude of the impacts are different.

### Cumulative Impacts

From a wildlife resource standpoint, this alternative is less desirable than Alternative A, but more desirable than B.

As a rule, wildlife deaths with this alternative were estimated to be about 10% greater for all major spe-

cies and groups than in Alternative A although they were not considered significant. The higher rate of human activity and shorter periods of protection for deer and antelope will cause more animals to be displaced during particularly stressful times of the year. The reduced area of protective stipulations on mineral development activities (about 10%) should have relatively little affect on wildlife since these areas are already existing high impact zones.

The shortened protective periods are not expected to greatly affect wildlife in most years since, in most winters, the animals are not occupying these areas during this time period. These shortened protective periods could have some increased impact on wildlife during severe winters. The increased level of mineral development activity in this alternative will cause more wildlife displacement than Alternative A. Acreage of habitat lost to development or degradation is about 50-100% greater (for deer and antelope) and reclamation remains the same.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

The type of residual impacts in Alternative C are the same as Alternative A; but the magnitude may vary.

There will still be animals removed and displaced in accidents, poaching, and vandalism (including harassment) as a result of management activities and human use. Some habitat will be permanently lost. The residual impacts of this alternative may be 25-30% greater overall than in Alternative A.

### D. Livestock Grazing Management

Same as Alternative B.

### E. Vegetation

Same as Alternative B.

### F. Recreation

Same as Alternative B.



### **G. Cultural Resources**

Same as Alternative B.

### **H. Paleontology**

Same as Alternative B.

### **I. Transportation**

Same as Alternative B.

### **J. Visual Resources**

Same as Alternative B.

### **K. Lands and Realty**

Same as Alternative B.

### **L. Salable Minerals**

Same as Alternative B.

### **M. Soils**

Same as Alternative B.

### **N. Air Resources**

Same as Alternative B.

### **O. Watershed**

Same as Alternative B.

### **P. Reclamation**

Same as Alternative A.

### **Q. Forestry**

Same as Alternative A.

## **IV. ALTERNATIVE D - CAP Based on Amended Pinedale RMP Decisions that Apply No Seasonal Restriction on Oil and Gas Exploration and Development Activities in Mule Deer, Antelope, Sage Grouse and Raptor Crucial Habitat.**

Alternative D, which was developed by the Rocky Mountain Oil and Gas Association (RMOGA) and provided to BLM, would amend the RMP decisions as follows: eliminate winter seasonal restrictions on well drilling and completion projects in deer and antelope crucial winter range; impose a time-of-day limitation on activity in sage grouse habitat, in-lieu of surface use limitations; establish a maximum ¼ mile radius surface use restriction area around sage grouse leks where necessary due to actual nesting activity; impose reasonable mitigation requirements which allow surface occupancy within 500 feet of water; and provide for road closures only after consultation and concurrence of the oil and gas operators.

Under this alternative, BLM will analyze the impacts of 900 wells being drilled in the study area in the next 10 years. One hundred fifty (150) wells will be drilled in the first year with the remaining 750 wells being drilled at the rate of 83 wells per year. Two hundred (200) wells would also be plugged and reclaimed over those 10 years. For more information refer to Chapter II, Alternative D.

## **A. SOCIOECONOMIC**

This alternative assumes that 900 wells will be drilled over the next 10 years at the rate of 150 the first year and 83 each year for the remaining 9 years. The drilling restrictions related to wildlife are largely determined by the oil/gas companies, and as such would not prevent the companies from drilling for 365 days if they choose to do so. However, it is assumed for the sake of the analysis that they would not choose to drill during January and February.

Drilling 150 wells the first year - Drilling 150 wells the first year of the 10-year period would require 10 drilling rigs and 15 completion rigs working full-time. These 25 rigs would require a total of 275 workers, of which 175 would be nonresidents. This non-resident total is almost 75% higher than the estimates of rig workers in 1989, raising the need for temporary housing substantially above that of 1989.



## ENVIRONMENTAL CONSEQUENCES

Temporary housing is currently in short supply in the area and some contractors are presently supplying housing to nonresident rig workers. Therefore, contractors would probably need to supply additional temporary housing for nonresidents when that group totaled 175.

Drilling 83 wells per season for 9 years - Drilling 83 wells in a 305-day drilling season would require 6 drilling and 9 completion rigs working full-time. These 15 rigs would need an average of 165 rig workers of which about 65 are assumed to be nonresident workers, requiring temporary housing. The 165 total is about 15% less than total rig workers estimated for 1989.

Direct income to the local area over 10 years is between \$342.5 million and \$343 million from oil/gas drilling activities. Reclaiming and plugging 200 wells over the 10 years would add another \$5 million.

### B. Oil and Gas

The greatest impact to industry will be finding the equipment, and personnel needed to provide the resources necessary to drill the number of wells planned in this alternative. There are no restrictions on the number of days available for drilling in a year as in the previous alternatives. Eight rigs would be needed to drill 150 holes in 1 year. Thirteen (13) completion rigs would be needed to complete 150 holes in 1 year providing they are all producers. These rig numbers are the same as in Alternative C.

Production under Alternative D could range up to an additional 525 mmcf/gpd once the 150 holes planned for year one are drilled and are producing. As in Alternative B, the refinery would have to expand to process this increase in production. Again, the best scenario for industry is to maintain a stable level or increase in the amount of drilling so that workers, equipment, production, and processing facilities can keep up with the demand on them to furnish natural gas to the consumers.

Royalties derived from the production of 150 producing wells would be from \$34,500-\$120,750 per day ( $.23 \times 1,000 \times 150$  mmcf/gpd;  $.23 \times 1,000 \times 525$  mmcf/gpd) depending on the price per mcf/g.

This alternative allows the greatest amount of development and cooperation for industry. Industry is allowed to take a very active role in mitigating habitat loss, road closures, level of development, and protection of sensitive resources within the area. However, industry will be scrambling to train people to work the rigs, convince the banks that loaning money for drill pipe and other equipment is sound, and conducting maintenance on the usable equipment that has been stored. This could include reconditioning of the drill rig. There is, presently, one manufacturer of drill pipe in the United States (USX).

According to a member of the International Association of Drilling Contractors, USX is not very interested in producing pipe. The pipe will probably come from Japan. Presently, new drill pipe costs \$20-\$25 a foot for 4.5 inch and \$25-\$30 for 5 inch. The cost to a drilling contractor to equip his rig with pipe could range up to \$500,000. The drilling work must also be economic enough for the drilling contractor to add new crews to accomplish the work. The work must be steady and long-lasting for the contractors to earn back the added costs of hiring new crews and, possibly, training them.

### Cumulative Impacts

This alternative maximizes the production of the oil and gas resources. It assumes that the greatest ultimate recovery of the gas resources can be achieved through the development of 900 new producing wells in the study area. This would result in the greatest volume of gas available for market needs and the maximum drainage efficiency of the hydrocarbon reserves for the area.

As in Alternative B, the development of gas resources would also increase the revenues to the Federal Government, State, county, and the local people.

### Mitigation

To mitigate the impacts the winter seasonal restrictions cause the oil and gas companies, the BLM could accept alternative mitigation. Rather than only listing the winter seasonal restriction, the BLM could allow the companies a couple of alternatives for mitigation and allow the companies to choose one. This could be accomplished by statements, such as the one below, being listed in the conditions of approval for development authorizations:

To protect wintering big game wildlife, no surface disturbance will be allowed from November 15 - April 30. This restriction may be waived in any year with written approval by the Authorized Officer. It may also be waived by contributing funds to the BLM to use in improving the range condition in the CAP area. The amount of the contribution will be a function of the area of surface disturbance in this proposal.

Mitigation would also include better planning for reclamation. This could eliminate the need for remedial reclamation work and would be a cost saving measure.

### Residual Impacts

Analysis has not indicated any residual impacts.



## ENVIRONMENTAL CONSEQUENCES

### C. Wildlife Habitat

Alternative D differs from Alternative A mostly in the level, or degree, of mineral development activities. Alternative D proposes three times as much development as Alternative A, eliminates seasonal protective stipulations for mule deer and antelope, suggests some alternative management options for raptors; and proposes an increased level of habitat development as mitigation or compensation. This suggested alternative relies heavily on the evaluation and recommendations of a report prepared for the oil industry by a consulting firm, Hayden-Wing Associates. The nature of the impacts to wildlife in this alternative are the same as Alternative A, but the level of impact is different.

#### Cumulative Impacts

From the standpoint of the wildlife resource, Alternative D is less desirable than Alternative A.

As a rule, wildlife killed as a result of increased mineral development activities and their associated actions in the CAP area in Alternative D is expected to run about 30% higher than in Alternative A.

Long-term displacement of deer, antelope, and raptors in this alternative is expected to run about 3 times greater than in Alternative A; for elk and moose about twice as great. Acreage of habitat lost or degraded in this alternative runs about 6-9 times greater (mostly due to compounded displacement on already poor condition range) for deer and antelope. Habitat degradation is not quite as great for the other species, relatively speaking.

It should also be noted that the suggested methods for handling sage grouse concerns and raptor nesting mitigation in this alternative are more labor intensive, more costly, and may be only marginally more effective.

Some increased level of habitat improvement work will occur (above the Alternative A levels), but most of the habitat development opportunities have already been identified in Alternative A.

#### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

#### Residual Impacts

The kind of residual impacts in Alternative D are the same as Alternative A; but the amount, or degree, of impact is different.

Climatic conditions and events, disease, predation, hunting and fishing, accidents, poaching, and harassment will still take a certain toll on the wildlife populations in the CAP area, resulting in animal deaths and displacement. Some habitat will continue to be permanently lost to the surface disturbance of development activities. The residual adverse impacts of this alternative will likely be 2½ to 3½ times greater than for Alternative A.

### D. Livestock Grazing Management

The proposed development level would result in impacts the same as Alternative A except that 6,009 acres and 414 AUMs would be affected in the short-term, and 5,199 acres and 359 AUMs would be lost for between 30 and 90 years. Road hazards to livestock would increase further under this alternative.

#### Cumulative Impacts

Cumulative impacts, mitigation measures, and residual impacts would be the same as under alternative A except that approximately 5,199 acres and 359 AUMs would be lost for up to 90 years. Road hazards to livestock would increase further.

#### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

#### Residual Impacts

Analysis has not indicated any residual impacts.

### E. Vegetation

The proposed development level would result in impacts the same as Alternative A except that 6,009 acres would be disturbed in the short-term, and 5,199 acres would be disturbed in the long-term.

#### Cumulative Impacts

Cumulative impacts, mitigation measures, and residual impacts would be the same as under alternative A except that approximately 5,199 acres would remain in a disturbed state for up to 90 years.



## ENVIRONMENTAL CONSEQUENCES

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

### F. Recreation

Under this alternative, the amount of surface disturbance is estimated to increase enough to cause a loss of habitat and a decrease in antelope numbers that would result in the loss of 500 antelope hunter days with a per day value of \$100.

This alternative would result in a change of character of the existing recreation experiences which are currently of a fairly high quality considering the level of development in the area. The intensity of development proposed would detract from the high quality experiences currently available.

It is also estimated that the reduced visual attractiveness of the area from oil/gas drilling would reduce the water related recreation along the Green River by 200 recreation days, valued at about \$31/day, or by a total of \$6,200 annually.

### Cumulative Impacts

The cumulative effect of this alternative would be a substantial loss of hunting opportunity and aesthetics. The CAP area would have so much industrial activity going on that it would become an unattractive place for outdoor recreation. The resident antelope and sage grouse populations would lose an estimated 30% of their habitat which would decrease their numbers. The increased level of surface disturbance would generate more silt to the streams in the area including the Green River. This would result in a loss of an estimated 200 visitor days of water related recreation annually.

### Mitigation

There is little that could be done to mitigate the loss of hunting opportunity; however, the soil loss and siltation of streams could be mitigated by implementing watershed treatment projects to reduce the siltation. The existing undeveloped sites could be managed for quantity, intensive type use.

### Residual Impacts

Analysis has not indicated any residual impacts.

### G. Cultural Resources

With three times the number of oil and gas wells planned than under Alternative A, considerably more disturbance to cultural resources can be expected from direct and indirect effects. However, an expanded oil and gas development alternative would result in increased cultural resource knowledge due to increased professional inventory, evaluation, and data recovery efforts, as avoidance proves less feasible.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

### H. Paleontology

With three times the number of oil and gas wells planned than under Alternative A, greater disturbance to fossils can be expected from vandalism, looting, and other indirect impacts.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.



## ENVIRONMENTAL CONSEQUENCES

### I. Transportation

The loss of flexibility with regard to BLM's jurisdiction over timing on road closures will result in increased maintenance requirements and costs due to use during times when road surface and drainage degradation are greatest.

By depending upon the operators in the CAP area to identify and close roads, BLM loses its legal management flexibility and statutory responsibilities with regard to access road locations and closures. This could lead to increased construction and maintenance requirements associated with steep side slopes, steep road grades, and additional design mitigation needed to provide for safe access routes.

An increase of 225 miles of road (32%), 100 miles of powerlines (50%), and 225 miles of pipeline (22.5%), will occur as a direct result of the proposed mineral development in the CAP area.

#### Cumulative Impacts

The reduction in BLM regulatory authority of installation and operation of oil and gas development in the CAP area will result in moderate negative impacts to quality of roads in the CAP transportation system.

#### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

#### Residual Impacts

Analysis has not indicated any residual impacts.

### J. Visual Resources

The overall impact of an increase in 900 wells and associated new roads, nine new mineral material sites, and development of additional support systems during the next 10 years will impact the visual resources of the CAP area. There will be nearly double the current level of activity level and amount of surface disturbance in the CAP area.

The relative density and distribution of development will adversely alter the visual characteristic of the area. The implementation of this alternative will reduce approximately 23,980 acres of VRM Class IV areas to Class V. Depending upon the distribution,

location, and application of appropriate mitigation, it will reduce approximately 340 acres of VRM Class III areas to Class IV and alter approximately 1,600 acres of VRM Class II areas to Class III.

#### Cumulative Impacts

By nearly doubling the number of wells currently in place in the CAP plus reducing the amount of regulation currently used by the BLM, the implementation of Alternative D will severely impact the visual resources of the CAP area although past impacts have already had a major effect on these visual resources.

#### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

#### Residual Impacts

Analysis has not indicated any residual impacts.

### K. Lands and Realty

The impacts associated with this alternative are similar to Alternative B; however, the impacts will be greater because of the additional workload anticipated under this alternative. BLM will not process all expected rights-of-way under this alternative and considerable case backlogs will develop. Right-of-way processing times will increase and construction delays will occur. Additional realty personnel and other specialists will eventually be required to avoid right-of-way processing delays.

#### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

#### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

#### Residual Impacts

Analysis has not indicated any residual impacts.



## ENVIRONMENTAL CONSEQUENCES

### L. Salable Minerals

The demand for mineral materials will increase by a three-fold amount. This equates to the depletion of the reserves in the existing six mineral material pits at a rate three times as fast as discussed under Alternative A. The mine life of the pits will be reduced from 15 years to 5 years.

The rapid depletion of the pits will necessitate the designation of at least nine (9) new mineral material pits to accommodate the increase in usage destined to the new well sites and rights-of-way.

The implementation of this alternative would mean that approximately 180 new acres would be disturbed. These new acres of disturbance will eliminate habitat and AUMs for wildlife and livestock for an additional 10 to 15 years. While new pits are being developed, the deleted pits would be undergoing reclamation and revegetation concurrently. The revegetation would require 3-5 years to take hold before it could be utilized by wildlife and livestock.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

### M. Soils

Under Alternative D, accelerated soil erosion would amount to an estimated 34,260 tons per year. This is an average annual rate of about 12.7 tons per acre per year from the disturbed area. This represents a 158% increase in erosion over Alternative A. This change is attributed to the increase in oil and gas activity. The amount of soil loss attributed to specific activities is presented in Table S-4.

### Cumulative Impacts

Cumulative impacts to soils are expected to be higher than Alternatives A-C due to more surface disturbance.

**Table S-4**  
**ESTIMATED SOIL LOSS UNDER ALTERNATIVE D**

Activity	Annual Acres Disturbed	Soil Loss (tons per year for the highest year)
<b>Minerals</b>		
New production well with associated road	450	31,500
Sand and Gravel Mining	11	260
<b>Range Improvements</b>		
Prescribed Burning/ Chemical Treatments	1,600	800
Mechanical Treatments	623	1,250
Reservoir Construction/ Reconstruction	6	450
<b>TOTAL</b>	<b>2,690</b>	<b>34,260</b>



## ENVIRONMENTAL CONSEQUENCES

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

### N. Air Resources

Air quality impacts for Alternative D would increase over Alternatives A and B due to increased emphasis on oil and gas development. Table AQ-3 depicts the air pollutant emissions which might result from this alternative.

**Table AQ-3**  
**Air Pollutant Emission for Alternative D**

Emission Source	Units	Measure	Pollutant	Amount (tons/yr)
Oil & gas well drilling	72-169	well	TSP or SO <sub>2</sub>	1,103 to 2,589
Oil & gas well drilling	72-169	well	NO <sub>x</sub>	16,545 to 38,836
Cumulative (yr) oil & gas	—	—	TSP	16,939
Cumulative (yr) oil & gas	—	—	SO <sub>2</sub>	15,316
Cumulative (yr) oil & gas	—	—	NO <sub>x</sub>	230,569
Access road use	1,550	miles	TSP	33
Surface disturbance	2,667	acres	TSP	121
Prescribed burning	3,800	acres	TSP	24.6
Prescribed burning	3,800	acres	PM <sub>10</sub>	19.7

**Notes:** Same as Alternative A.

Cumulative oil and gas emissions were calculated assuming that 1,980 (1,080 existing (10% electric powered) plus 900 (303 internal combustion engine powered) new) wells would be in operation and 72 wells being drilled per year.

Access road use was estimated to be 700 miles existing plus 0.5 mile for each new well (using 850 has an estimate). Emissions for TSP were using an emission factor of 43 lbs per mile per year for road average usage. This factor was taken from the Riley Ridge Air Resources Technical Report.

The emissions planned under this alternative could reduce visibility to 86 kilometers or cause a 47% reduction in visual range during a 48-hour plus stagnation event (with 600-meter mixing height) having an average relative humidity of 70%.

### Cumulative Impacts

Cumulative impacts for this alternative will be much the same as for Alternative B except that the slightly increased oil and gas development will increase impacts to air quality in general and visibility in particular. Since the new proposed development will utilize technology which would result in less emissions than older, existing methods, the overall

impact to air quality would not be much different than under Alternative A or B.

### Mitigation

Same as Alternative B.

### Residual Impacts

Same as Alternative B.

### O. Watershed

Under Alternative D, total suspended sediment loads in the Green River could increase by 4.7% (1,713 tons per year). Salt loading from this sediment could add up to about 1.5 tons of salt per year to the Colorado River System.

### Cumulative Impacts

#### Impacts to Surface Water

Cumulative impacts to water are expected to be higher than the other alternatives due to increased



## ENVIRONMENTAL CONSEQUENCES

surface disturbance. Refer to Alternative A's cumulative impacts for further discussion.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

### P. Reclamation

Same as Alternative A.

### Q. Forestry

Same as Alternative A.

## V. ALTERNATIVE E - CAPS Based on Amended Pinedale RMP Decisions to Provide for Maximum Level of Oil and Gas Development.

This alternative amends the RMP decisions as follows: increases the level or rate at which oil or gas development would occur to 900 wells which may be drilled in the next 10 years; and relies solely on the oil and gas industry to voluntarily provide consideration for wildlife and wildlife habitat protection needs in their oil and gas operations.

This alternative will provide for no conditions of approval (COAs) for seasonal restrictions to protect wintering, breeding, or nesting wildlife; allows for no relocation requirements to protect mountain shrub communities or other biologically sensitive resource values or areas (e.g., streams, fawning areas, wetland/riparian habitat); provides no restriction to protect wildlife habitat or values (e.g., sage grouse lek, raptor nest); nor any road closure considerations to protect winter habitat or wintering wildlife from harassment.

Under this alternative BLM assumes that 900 new wells would be drilled in the study area over the next 10 years. 150 wells would be drilled in the first year. The remaining 750 wells would be drilled over the

next 9 years, at the rate of about 83 per year. Two hundred (200) wells would also be reclaimed over those 10 years. For more information refer to Chapter II, Alternative E.

### A. Socioeconomic

Same as Alternative D.

### B. Oil and Gas

This alternative impacts the oil and gas industry by making the industry responsible for self-mitigation to protect the resources. Industry would monitor their activities and provide whatever mitigation they felt necessary for the impacts of their activities that affect other resources. Specialists will be needed to monitor the wildlife, vegetation, air quality, and hydrology. Other impacts would be the equipment and people needed to meet the demand of the industry. These impacts are discussed in detail in Alternative C and D. Economics become the limiting factor in this alternative. Production and royalty revenues would be similar to Alternative D.

### Cumulative Impacts, Mitigation, and Residual Impacts

Same as Alternative D.

### C. Wildlife Habitat

Alternative E differs from Alternative A principally in the level of mineral development activities, and the lack of any exercised control over them. Alternative E proposes three times as much development as Alternative A, and does not stipulate any wildlife considerations in these activities. The nature of the impacts to wildlife in this alternative are the same as Alternative A, but the degree, or intensity, of impact is different.

### Cumulative Impacts

From a wildlife resource standpoint, Alternative E is far less desirable than Alternative A.

Generally, wildlife killed as a result of increased mineral development activities and their associated actions in this alternative are estimated to go about 30% higher than in Alternative A.

Long-term displacement of all species in this alternative runs from 3-9 times greater than in Alternative A, with no off-setting or countering control of these



## ENVIRONMENTAL CONSEQUENCES

actions. The effect is a greatly increased displacement of some species (e.g., elk, sage grouse, raptors). Acreage of habitat lost to the development in this alternative is 5-9 times greater than in Alternative A, with no off-setting surface protection measures or mitigation.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

The kind of residual impacts in Alternative E are the same as Alternative A; but the amount, or degree, or impact is different.

Climatic conditions and events, disease, predation, hunting and fishing, accidents, poaching, and harassment will still take a certain toll on the wildlife populations in the CAP area, resulting in animal deaths and displacement. Some habitat will continue to be permanently lost to the surface disturbance of development activities. The residual adverse impacts of this alternative will likely be 3½ to 4 times greater than for Alternative A.

### D. Livestock Grazing Management

Same as Alternative D.

### E. Vegetation

Same as Alternative D.

### F. Recreation

Same as Alternative D.

### G. Cultural Resources

Same as Alternative D.

### H. Paleontology

Same as Alternative D.

### I. Transportation

Same as Alternative D.

### J. Visual Resources

Same as Alternative D.

### K. Lands and Realty

Same as Alternative D.

### L. Salable Minerals

Same as Alternative D.

### M. Soils

Same as Alternative D.

### N. Air Resources

Same as Alternative B.

### O. Watershed

Same as Alternative D.

### P. Reclamation

Same as Alternative D.

### Q. Forestry

Same as Alternative D.

## VI. ALTERNATIVE F - CAP Based on Amended Pinedale RMP Decisions to Further Enhance Surface Resource Protection.

Alternative F, which was developed by the National Wildlife Federation, the Wyoming Wildlife Federation, and the Wyoming Chapter of the Sierra Club, and provided to BLM, amends the RMP decisions with the following provisions: reduces the level of oil and gas leasing and development, reduces road access, provides for more intensified manage-



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ment of livestock use in the study area, increases protection of mountain shrub communities, promotes more intense habitat management efforts, recommends an increased level of resource management involvement and cooperation between BLM and other interest groups, directs forest management at enhancement of other resources, provides for land tenure adjustments to improve management of the riparian areas and recreation opportunities, and urges adoption of the State of Wyoming best management practices for watershed protection.

Under this alternative 200 new wells would be drilled in the study area over the next 10 years. The two hundred (200) well level is based on a basic premise that development would only be allowed to occur at the same rate as reclamation, on an acre for acre basis. For more information refer to Chapter II, Alternative F.

### A. Socioeconomic

This alternative stipulates that only 200 wells will be drilled over the 10-year period at the rate of 20 per year. Drilling restrictions are the same as in Alternative A. Therefore, three scenarios will be considered as follows: (1) That the entire CAP area would be subject to the November 15 to July 31 drilling restrictions and drilling would be suspended for 258 days, leaving only a 107-day drilling season. (2) drilling in the entire area is restricted from November 15 through April 30 (166 days) to protect crucial winter range and areas of concentration for deer, antelope, and some birds. Exceptions and mitigation measures are likely to be applied as needed during the February 1 to July 31 restriction period for game birds and raptors making restrictions in this period infrequent. (3) exceptions and mitigation measures are possible throughout the entire November-July restriction period, allowing drilling to proceed as long as the well being of wildlife is not adversely impacted.

Scenario 1 is a virtually impossible scenario because it assumes all 200 wells in the CAP area would have nesting birds in the immediate vicinity of the proposed well pads and, subsequently, be subject to seasonal nesting restrictions. Historically, less than 5% of all permitted wells have actually been delayed due to nesting birds.

Scenario 2 is the closest to what actually would be expected to occur in the CAP area under this alternative. However, it assumes that the entire CAP area and the 200 wells would be subject to the crucial deer winter range drilling restrictions. In fact, not more than 70% of the CAP area is regarded as crucial deer and antelope winter range and, under this alter-

native, not more than 70% of the area would be deer and antelope winter range subject to winter drilling restrictions. Therefore, wells could be drilled in 30% of the CAP area year-round.

Scenario 3 is overly optimistic. While exceptions to various restrictions could be granted under applicable conditions, these exceptions are not assured. Therefore, all work should be scheduled for completion prior to November 15.

**Scenario 1** - Drilling activity is permitted in only 107 days of the year. It assumed for this and the other scenarios in this alternative that 20 wells will be drilled every year for 10 years and that 20 wells will be reclaimed each year.

Assuming that one drilling rig can drill only 5 wells in a 107-day season and that a completion rig can complete only about 3 wells in this time period, to drill 20 wells per season would require 4 drilling rigs and 7 completion rigs. These 11 rigs would need 115 rig workers of which 15 are assumed to be nonresidents. The 115 total equals less than 60% of the level of rig workers estimated for 1989. Only 15 of these workers would be nonresidents needing temporary housing.

In summary, over the 10 years this scenario would provide the local economy with about \$94 million in direct income from oil/gas drilling activities and well site reclamation and plugging projects.

**Scenario 2** - This scenario assumes that drilling in the area is completely restricted from November 15 through April 30, but is infrequently restricted February through July.

It is estimated that 1 rig can drill 10 wells/199 day season and 1 completion rig can complete almost 7 wells. Therefore, to drill 20 wells in this time period would require 2 drilling rigs and 3 completion rigs with a total of 55 rig workers, about ¼ the number of workers estimate for 1989. These workers are assumed to be local residents.

In summary, 10 years under this scenario would provide the local area with between \$93 and \$94 million from oil/gas drilling activities and well site reclamation and plugging projects.

**Scenario 3** - This scenario assumes that mitigation measures and exceptions are possible throughout the entire November-July restriction period, allowing drilling to proceed as long as the well being of wildlife is not adversely impacted. It assumes a 305-day season, estimating that oil/gas companies will not drill during January and February.



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In a 305-day season, it is estimated that 1 rig can drill about 15 wells and 1 completion rig can complete about 10 wells. Therefore, to drill 20 wells/season would require about 2 drilling rigs and 2 completion rigs, with a total of 50 rig workers, roughly  $\frac{1}{4}$  the level of rig workers estimated for 1989. These workers are assumed to be local residents.

In summary, 10 years under this scenario would provide the local area with almost \$96 million from oil/gas drilling activities and well site reclamation and plugging projects. However, it was assumed for all alternatives that rig workers would work a 48-hour week, and it is very likely that this could drop to 42 hours/week or less in a 305-day season when only 20 wells are drilled.

If a work week were only 42 hours, then the total income to the local area over the 10-year period from this scenario would be slightly under \$91 million.

The socioeconomic analyses for resources other than oil and gas are included in each alternative within the specific resource sections.

### B. Oil and Gas

As industry drills wells, it must reclaim the same amount of acreage as it disturbs. Industry has given a figure of 200 wells they feel can possibly be reclaimed over a 10-year period. They will then be allowed to utilize as many acres, for drilling and access, as the total acres reclaimed for the 200 plugged and abandoned wells and access roads. Since many of the plugged and abandoned wells are old well locations with more surface disturbed than required for the new locations, it is possible more than 200 wells could be drilled in the 10-year period.

Two hundred wells will not adequately develop the area's oil and gas reserves. The rate of development (20 wells per year) will not allow companies to react to the present level of demand for gas.

When oil prices increase there is an increase in the demand for natural gas. Once a gas well is put into production the production from that well begins to decline. When it declines to a point it is no longer economical to produce, it is plugged and abandoned. Although the life span of a well, in the CAP area, may be expected to range from 30-90 years it must be recognized production is declining in every well producing.

Under this alternative, the total number of producing wells will remain at approximately 1,080. The production from the 20 new wells drilled and the loss of production from the 20 wells plugged and abandoned, for each year, may not compensate for the production decline of the remaining 1,060 wells. This would be in direct conflict with the greatest ultimate recovery and conservation of resource provi-

sions of the Mineral Leasing Act. Industry would go from development of the gas resources to a maintenance scenario. Economically, in terms of income and local impacts, the entire field could be in a decline under this alternative.

Production generated from drilling and producing 20 wells per year would range from 20 mmcf/gpd to 70 mmcf/gpd in contrast to Alternative A (50-175 mmcf/gpd), to Alternative B (100-350 mmcf/gpd), and to Alternative D (150-525 mmcf/gpd). Royalties generated from this production could range from \$4,000-\$16,100 per day in Alternative F, from \$11,500-\$40,250 per day in Alternative A, from \$23,000-\$80,500 per day in Alternative B, and from \$34,500-\$120,750 per day in Alternative D.

Severe winter weather, a continuing escalation in oil prices and the current 8.6 percent national decrease in availability of oil commodities could create increased demands for gas from the CAP area. Downstream users, who would need an increase in gas production may not see an increase in the volume of gas necessary for demands.

The seasonal and surface use restrictions will cause impacts as discussed in Alternative A. However, the prohibition of all off-road activity, throughout the year, could impact the industry significantly if geophysical exploration were not allowed.

Alternative F does not allow industry to find more natural gas in accordance with our current national energy policy. If industry is not allowed to fully develop this field, the mandate given to BLM is not fulfilled. The community suffers because the companies will not be spending additional monies in the communities. In fact, the lack of incentive to develop may cause some companies to invest elsewhere. The State of Wyoming and the Federal Government will not gain additional revenues generated from the production of new wells over and above the 200 wells.

The use of one existing well pad to accommodate the directional drilling of several wells may not be feasible. Gas wells, to a tight formation is zones from 3,000-8,500 feet in depth, may not be economical to drill directionally given the patterns of one well to 80-160 acre spacing. Drilling and completion costs would be prohibitive resulting in potential losses of hydrocarbon reserves due to the loss of interest and the economics of drilling. The current onshore oil and gas Federal regulations do not have provisions that allow for the production of one lease from another lease. To attempt to directionally drill multiple wells from one location would create legal nightmares.

Horizontal drilling is a new development in the oil and gas industry, but cannot be legally considered on a series of small Federal leases. Drainage factors,



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spacing concepts, minerals ownership, and geologic parameters would have to be amendable to this type of technology. This is unresolved or unknown at this time.

### Cumulative Impacts

The production of oil and gas is minimized. Gas reserves would not be developed with the greatest ultimate recovery in mind. Increasing market demands could not be considered as a development factor resulting in economic losses to the industry as well as commodity lost to the public. Under this scenario, the mandate from the President and the BLM Director would not be fulfilled and the intent of the Mineral Leasing Act of 1920 for conservation of resources would be denied. The field would not be efficiently developed, so there would be a loss of product, revenues, and people to the CAP area. The seasonal restriction and the surface use restrictions impact as discussed in Alternative A. The prohibition of off-road activity throughout the year could prevent geophysical exploration.

The cumulative impacts to the local oil and gas companies are the same as Alternative A with the added impact imposed by the limit of wells. This would severely affect a company's ability to maximize production and income for the area. The additional production from the 20 wells may not offset the decline in production from the existing wells. If this were the case, the oil and gas operators would experience a slow decline in income from their local operations. Under this alternative, efficient development of the oil and gas resources would not occur over the next 10 years.

### Mitigation

The decrease in the number of wells allowed to be drilled should be mitigated. The number of wells allowable for drilling is too low and could cause an eventual decrease in production and revenues.

### Residual Impacts

The residual impact under the 200-well scenario would be the economic impacts to the local communities.

### C. Wildlife Habitat

Alternative F differs from Alternative A mostly in the manner in which environmental protective measures are enforced. Alternative F allows mineral development surface disturbance to occur only at the

rate that reclamation of old activities progresses; it imposes a minimum surface disturbance approach (i.e., NSO on leases, multiple wells from single locations, etc.); a more aggressive reclamation and excess road closure effort; an accelerated approach to management of livestock grazing; and a more open forum for public involvement in public land management activities.

Many of the features of Alternative F are already present in Alternative A, but are not pursued as emphatically. The nature of the impacts to wildlife in this alternative are the same as Alternative A, although the magnitude of these impacts are different.

### Cumulative Impacts

From the standpoint of the wildlife resources, this alternative is more desirable, overall, than Alternative A.

Wildlife deaths with this alternative were estimated to be slightly less for all major species and groups than in Alternative A. It is estimated that there would be about 30% less wildlife displacement in Alternative F than in Alternative A, mostly reflecting a reduced level of mineral development activities.

Acreage of habitat degraded or lost to development averages about 30% less than in Alternative A. Acreage of habitat improved is about the same as Alternative A, but it is estimated to progress at about twice as fast a rate. There would be slightly more habitat improvement projects conducted, but most of these opportunities have already been identified in Alternative A. Chances for degradation of aquatic/fisheries habitat are reduced, and some opportunities are identified for aquatic habitat improvement through habitat project work and protection of in-stream flows.

### Mitigation

No new mitigation measures. However, there by be mitigation measures required by law, regulation, or policy.

### Residual Impacts

The nature of the residual impacts for this alternative are the same as Alternative A; only the magnitude of the impacts are different.

The residual adverse impacts of this alternative may be slightly less (possibly 10%) than for Alternative A.



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### D. Livestock Grazing Management

The proposed development level would result in impacts the same as Alternative A except that 3,099 acres and 214 AUMs would be affected in the short-term (less than 5 years) and the long-term (between 30 and 90 years). Road hazards to livestock would be reduced slightly from the current situation.

The Deer Hills Allotments, Upper North LaBarge Allotment, North LaBarge Common and Calpet Common Allotments range improvements and utilization limits would result in impacts the same as Alternative A except that limiting utilization on uplands to 40% could have significant impacts on livestock operations if livestock were required to be moved off the allotment when the utilization limit was reached, as opposed to a grazing system and a package of range improvements designed to improve livestock distribution. Removing livestock from an allotment early would require the operator to arrange for alternative pasture for his livestock on short notice.

Three scenarios were developed to analyze the range of impacts on livestock operations and socioeconomics that would result from the utilization limits on riparian areas required by this alternative.

The first scenario in this alternative would provide that riparian areas would be fenced, and that those in deteriorated condition would be grazed at no more than 30% and no riparian area would be grazed at over 40%. When the utilization limit was reached, livestock would not be removed from the allotment, but would be excluded from the riparian areas. This scenario also assumes that this would cause a reduction of between 286 and 573 in available AUMs per year. This would result in a decline of from \$518 to about \$1,000 in annual grazing fee returns to the Federal Government. If livestock operators needed to utilize these reduced AUMs and had to acquire them from private sources, it would cost them approximately \$2,500 to over \$5,000 annually. These results are calculated using grazing fees of \$1.81/AUM and private fees of \$8.93/AUM. However, the availability of private AUMs in the CAP area is unlikely.

The resulting combined loss of direct personal income to affected operator households from a 286-573 AUM reduction would be almost \$3,000-\$6,000 each year. The loss of personal income to Sublette County would be slightly over \$10,000-\$20,000 annually.

A second scenario would be a 40% forage utilization limit on riparian areas before livestock are moved out of the allotment completely. This would result in a 19,457 reduction in available AUMs per year. This equates to a loss in grazing fee receipts to the Federal Government annually of over \$35,217. To replace these AUMs from private sources would cost livestock operators almost \$173,751 annually.

It is estimated that livestock operators could not acquire private AUMs in the CAP area to substitute for the loss of public AUMs. Therefore, operators would need to purchase forage for livestock or move them to pastures outside of the CAP area. If circumstances prevented operators from taking such action, they would probably be forced out of business.

The 19,457 AUM reduction in CAP public grazing would result in a combined loss of personal income to affected livestock sector households of slightly over \$202,000 each year. The loss of personal income to Sublette County would amount to almost \$682,000 yearly.

The third scenario assumes a 30% forage utilization limit on riparian areas before livestock are moved out of the allotment completely. This would result in a 19,744 reduction in available AUMs per year. With this assumption, the Federal Government's receipts would be down almost \$35,737 annually, and the replacement costs for livestock operators for acquiring these AUMs from private sources would be over \$176,314 each year. However, private AUMs in the CAP area are probably not available. This would require operators to take the actions specified in the above paragraphs or, probably, go out of business.

The 19,744 AUM reduction would result in combined direct personal income loss to affected households in the livestock sector of over \$205,000 yearly. Loss of personal income to Sublette County would amount to almost \$692,000 annually.

### Cumulative Impacts

Cumulative impacts, mitigation measures, and residual impacts would be the same as under Alternative A except that approximately 3,099 acres and 214 AUMs would be lost for up to 90 years.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

### E. Vegetation

The proposed level of development would result in impacts the same as Alternative A except that



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3,099 acres would be disturbed in both the short- and long-term.

The Deer Hills Allotments, Upper North LaBarge Allotment, North LaBarge Common and Calpet Common Allotments range improvements and utilization limits would result in impacts the same as Alternative A except that limiting utilization levels immediately would increase the rate of vegetative improvement.

Limiting utilization on riparian areas to 30% on degraded riparian areas and 40% maximum on all riparian areas would create the same impact as under Alternative A even though utilization limits are lowered by 10%.

### Cumulative Impacts, Mitigation, and Residual Impacts

Cumulative impacts, mitigation measures, and residual impacts would be the same as under Alternative A except that approximately 3,099 acres would remain in a disturbed state for up to 90 years. And improvement in overall vegetative conditions may be slightly accelerated due to accelerated development of AMPs and range and wildlife habitat improvement projects.

### F. Recreation

This alternative is the environmentally preferable alternative. It would provide the greatest protection to the natural environment and to wildlife habitat. For every new well drilled, there would be an old well plugged and abandoned. All unneeded and unused roads would be closed, reseeded, and reclaimed.

These actions would benefit deer winter range and sage grouse strutting and nesting areas. As a result of these actions, hunting opportunity for deer and sage grouse would improve. The expected increase in hunter days would be outside the CAP area since the deer herd that winters in the plan area is not in the area during the hunting seasons. The benefit to sage grouse hunting would accrue in the plan area. The improved habitat conditions would also improve the visual resource which would enhance the water related recreation on the Green River. This alternative would result in an estimated increase of 200 deer hunter days outside the plan area and an increase of 50 sage grouse hunter days in the plan area. There would also be an expected increase of 50 visitor days of water related recreation along the Green River.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## G. Cultural Resources

With only two thirds the number of oil and gas wells as that planned for Alternative A, less disturbance to cultural resources can be expected from vandalism, looting, and other direct and indirect impacts. In addition, constraints on vehicle travel that are proposed under this alternative would lessen direct and indirect impacts to cultural resources.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

## H. Paleontology

With only two thirds the number of oil and gas wells as that planned for Alternative A, less disturbance to paleontological remains can be expected from vandalism, looting, and other indirect impacts.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.



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### Residual Impacts

Analysis has not indicated any residual impacts.

### I. Transportation

An increase of 50 miles of road (7%), 10 miles of powerlines (5%), and 50 miles of pipeline (5%), will occur as a direct result of proposed mineral development in the CAP area.

### J. Visual Resources

Since the Guidelines for Surface Disturbing Activities will be required in permitting each of the APDs, the overall impact of an increase in 200 wells during the next 10 years will only impact slightly the visual resources of the CAP area. There will be a slight increase in activity levels and due to the lag time following completion of reclamation projects, the amount of surface disturbance in the CAP area will initially increase slightly.

Relative density or distribution of facilities and disturbance will not alter the visual characteristics of the area.

Several additional conservation efforts proposed in the CAP will serve to further reduce the existing visual contrast in the area. However, no significant improvements in the area's existing VRM Classes will occur until oil and gas development in the CAP declines substantially.

### Cumulative Impacts

The small increase in activity in concert with the additional conservation measures proposed for the CAP area will result in a slight adverse impact in the visual resource values of the area.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

### K. Lands and Realty

This alternative is the same as described for Alternative A. In addition, BLM would seek to acquire public access to public land around Sixty-Seven Reservoir.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

### L. Salable Minerals

Same as Alternative A.

### M. Soils

Under Alternative F accelerated soil erosion would amount to an estimated 6,960 tons per year. This is an average annual rate of about 3 tons per acre per year in the CAP area. This represents a 52% decrease in erosion compared to Alternative A. The amount of soil loss attributed to specific activities is presented in Table S-6.

### Cumulative Impacts

Cumulative impacts to soils are expected to be much less than any other alternative due to less surface disturbance.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.



## ENVIRONMENTAL CONSEQUENCES

Table S-6

### ESTIMATED SOIL LOSS UNDER ALTERNATIVE F

Activity	Annual Acres Disturbed	Soil Loss (tons per year for the highest year)
<b>Minerals</b>		
New production well with associated road	60	4,200
Sand and Gravel Mining	11	260
<b>Range Improvements</b>		
Prescribed Burning/ Chemical Treatments	1,600	800
Mechanical Treatments	623	1,250
Reservoir Construction/ Reconstruction	6	450
<b>TOTAL</b>	<b>2,300</b>	<b>6,960</b>

### Residual Impacts

Analysis has not indicated any residual impacts.

### N. Air Resources

Air quality impacts to the study area would be reduced from the reduction of oil and gas activities under this alternative. Table AQ-4 depicts the amount of emissions would result from the implementation of this alternative.

Cumulative oil and gas emissions were calculated assuming that 1,280 (1,080 existing plus 200 (66 in-

ternal combustion engine powered) new) wells would be in operation and 28 wells being drilled per year.

Access road use was estimated to be 700 miles existing plus 0.5 mile for each new well (using 214 has an estimate). Emissions for TSP were using an emission factor of 43 lbs. per mile per year for road average usage. This factor was taken from the Riley Ridge Air Resources Technical Report.

The emissions planned under this alternative could reduce visibility to 93 kilometers or cause a 43% reduction in visual range during a 48 hour plus stagnation event (with 600 meter mixing height) having an average relative humidity of 70%.

Table AQ-4

### Air Pollutant Emission for Alternative F

Emission source	Units	Measure	Pollutant	Amount (tons/yr)
Oil & gas well drilling	28-66	well	TSP or SO2	429 to 1,011
Oil & gas well drilling	28-66	well	NOx	6,434 to 15,166
Cumulative (yr) oil & gas	—	—	TSP	13,192
Cumulative (yr) oil & gas	—	—	SO2	11,872
Cumulative (yr) oil & gas	—	—	NOx	178,736
Access road use	914	miles	TSP	20
Surface disturbance	2,277	acres	TSP	104
Prescribed burning	3,800	acres	TSP	24.6
Prescribed burning	3,800	acres	PM10	19.7

**Notes:** Same as Alternative A.



## ENVIRONMENTAL CONSEQUENCES

### Cumulative Impacts

Cumulative impacts for this alternative will be somewhat less than Alternative A due to the slightly decreased oil and gas development. Since the new proposed development will utilize technology which would result in less emissions than older, existing methods, the overall impact to air quality would not be much different than under Alternative A.

### Mitigation

Same as Alternative B.

### Residual Impacts

Same as Alternative E.

### O. Watershed

Under Alternative F, total suspended sediment loads in the Green River could increase by 1.0% (348 tons per year). Salt loading from this sediment could add up to about 0.3 tons of salt per year to the Colorado River System.

### Cumulative Impacts

Cumulative impacts to water are expected to be much less than any other alternative due to less surface disturbance. Refer to Alternative A's cumulative impacts for further discussion.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.

### P. Reclamation

Same as Alternative A.

### Q. Forestry

The same as Alternative A. Since the timber sale scheduled for FY 1995, (77 acres of Douglas fir), meets the needs of other programs, particularly wildlife and recreation, while improving the health of the existing forest stand it would be still be offered for sale.

### Cumulative Impacts

Analysis has not indicated any cumulative impacts.

### Mitigation

No new mitigation measures. However, there may be mitigation measures required by law, regulation, or policy.

### Residual Impacts

Analysis has not indicated any residual impacts.







# CHAPTER V

## CONSULTATION AND COORDINATION

### INTRODUCTION

As a result of increased interest in drilling oil and gas wells in the area west of Highway 189, between Big Piney and LaBarge, Wyoming, the staff in BLM's Pinedale Resource Area recognized a need to prepare a Coordinated Activity Plan (CAP). Activity planning is the third tier of the Bureau's planning process. The CAP interprets decisions from the Resource Management Plan (RMP) into management guidance for administering uses in specific areas.

A protest on the Pinedale RMP objected to applying seasonal restrictions to activity on existing oil and gas leases which did not contain a seasonal restriction. These restrictions are applied as Conditions of Approval (COAs) on Applications for Permits to Drill (APDs) oil and gas wells. The protest was dismissed by BLM's Director, leaving the decision in the Proposed RMP unchanged. A Record of Decision (ROD) was prepared in December 1988 to describe all the decisions in the Pinedale RMP. The decision to impose seasonal restrictions on existing, non-stipulated leases was included in the Pinedale ROD. Because the controversy over this decision has remained unchanged, a public scoping process was initiated for the CAP.

On March 20, 1990, the draft Big Piney-LaBarge Coordinated Activity Plan was circulated to the public. Approximately 100 people were sent copies of the CAP. The "Dear Reader" letter enclosed in the draft CAP explained that: "after this draft CAP has been reviewed, some provisions of the plan may be modified before the plan is summarized as the Proposed Action for an environmental assessment (EA) . . ." Written comments were requested.

A public meeting was held at the Marbleton Fire House in Marbleton, Wyoming, at 7 p.m. on April 5, 1990. Ray Brubaker, BLM's Wyoming State Director, attended the meeting which was chaired by Fred Parady, a member of BLM's Multiple Use Advisory Council. The meeting was attended by approximately 130 people. Several representatives from the Wyoming Game and Fish Department also attended the public meeting. Earlier in the Day (1:30 to 4:30 p.m.) resource specialists who helped prepare the draft CAP held an open house at the Fire House to explain the plan and to answer any questions. The following day, BLM met with representatives of the oil and gas industry to discuss specific concerns.

Thirty-eight comment letters were received on the draft CAP. They were considered in modifying the CAP and summarizing it as the Proposed Action in this EA, and in developing the alternatives.

### Comment letters were received from:

Mike Sullivan, Governor of Wyoming  
Wyoming Game and Fish Department  
Wyoming Geological Survey  
Wyoming Oil and Gas Conservation Commission  
Wyoming Public Service Commission  
Wyoming State Archives, Museums, and Historical Department  
Wyoming Department of Environmental Quality  
Christmann Energy Corporation  
Northwest Pipeline Corporation  
Mobil Exploration and Producing, Inc.  
Rocky Mountain Oil and Gas Association  
Yates Petroleum Corporation  
Sierra Club, Northern Great Plains Region  
School District Number 9, Sublette County  
Bishop Petroleum Corporation  
Enron Oil and Gas Company  
General Atlantic Resources, Inc.  
Petroleum Association of Wyoming  
Wyoming Wildlife Federation

Debbie March  
J.D. Lightner  
Robert A. Springman  
Dorothy Kemper  
Dan Krause  
Dwight Parrish  
Dave Covill  
Timothy S. Heils  
Brown and Drew  
Jack W. McCaw  
Richard F. Gordonec  
Unknown (3)  
Diana Christopher  
Jay McGinnis  
Janet Richardson  
Kathy H. Porter  
Dennis Brubec

### Summary of Public Meeting

Most of those present at the meeting were concerned that all oil and gas drilling activity would be "shut down" for approximately 6 months of the year due to seasonal restrictions and that this shut down would have adverse impacts on the economy of the local area. The public emphasized the importance of the oil and gas industry to the local economy and the degree to which it supports local schools and public services.



## CONSULTATION AND COORDINATION

Industry was concerned that the seasonal restrictions imposed on approved APDs were tantamount to taking away some rights that were granted in the oil and gas lease. They felt that the degree to which BLM could impose restrictions on oil and gas operations is constrained by regulation (43 CFR 3101).

The BLM explained that constraints are imposed on all activities to protect certain resource values. The most important issue in the CAP is a seasonal restriction in crucial big game winter range. The seasonal COAs are included in approved APDs because

APDs are valid for a 1-year term. This means that a well could be drilled at any time during the year for 1 year after the APD is approved if there are no seasonal restrictions on the lease or the APD.

In addition, the BLM explained that the Authorized Officer (BLM) could approve exceptions to the seasonal restrictions. The exceptions could be approved if the objectives of the restriction could be met even if an activity is allowed to proceed. Historically, a large percentage of the requested exceptions have been approved.

### LIST OF PREPARERS COORDINATED ACTIVITY PLAN

OFFICE/NAME	SECTION PREPARED
<b>Pinedale Resource Area Office</b>	
Greg Noble	Team Leader, Oil and Gas
Tom Curry	Roads, Surface Disturbance, Reclamation
Bob McCarty	Wildlife, Vegetation
Ramsey Bentley	Groundwater, Solid Minerals, Paleontology
David Vlcek	Cultural
Fred Roberts	Range Management
Jack Bogle	Wilderness, Visual Resources, ORV, Recreation
Dave Harper	Lands and Realty
Bill Lanning	Forestry
<b>Rock Springs District Office</b>	
Bill McMahan	District Office Coordinator
Chris Butler	Watershed
John MacDonald	Soils
Susan Smith	GIS Maps (ADS/MOSS)
Angelina Pryich	Writer-Editor

### ENVIRONMENTAL ASSESSMENT

#### Wyoming State Office

Bill Daniels	Team Leader
Eugene Jonart	Technical Coordinator
Beverly Gorny	Writer, Editor
Dave Roberts	Wildlife, Riparian
Clif Fanning	Soils, Water, Hydrology
T.R. Beaven	Fluid Minerals



## CONSULTATION AND COORDINATION

### LIST OF PREPARERS (Continued) COORDINATED ACTIVITY PLAN

OFFICE/NAME	SECTION PREPARED
<b>Wyoming State Office (continued)</b>	
Vickie Daniels	Geologist
Don Glenn	Vegetation, Livestock Grazing
Al Riebau	Air Quality
Wally Stiles	Solid Minerals
Tom Lahti	Transportation, VRM/Compliance
Wayne Erickson	Recreation, Wilderness
Ray Leicht	Paleontology, Cultural, Historical
Carl Santmyer	Socioeconomic
Tina Roberts	Typist







# APPENDIX A

## GUIDELINES FOR SURFACE-DISTURBING ACTIVITIES

The following are general standard operating procedures applied to surface-disturbing activities. These measures are applied, when necessary, to reduce environmental impacts. Some projects may require construction and use plans (CUP) and/or erosion control revegetation and restoration plans (ERRPs). These situations will also require a site specific environmental analysis to address impacts and appropriate mitigation measures.

### GENERAL GUIDELINES FOR DEALING WITH TOPSOIL AND SPOIL

Before a surface disturbing activity is authorized, the amount of topsoil to be removed and storage areas will be specified. A minimum of six inches of topsoil and other plant growth medium available will be removed and stored. More than six inches may be required if it is available so that it may be used offsite in areas that do not have adequate topsoil. Areas which have excess stored topsoil will be marked for use as borrow areas for other areas deficient in topsoil. Whenever possible, topsoil will be used for immediate reclamation. For topsoil stockpiles that are to be kept through the winter, erosion will be controlled by reducing the piles to less than 3 feet in height and by seeding and/or mulching them.

Topsoil stockpiles will be designed to maximize surface area to reduce impacts to soil microorganisms. All surface vegetation will be incorporated directly into the topsoil as organic matter and seed source unless brush is required to be handled separately.

For pipelines on slopes less than 10 percent, a minimum of six inches of topsoil will be stripped from the trench and spoil storage side and placed into a berm by side casting with a grader. Topsoil will not normally be stripped from the working side of the trench.

After the pipe is installed and the spoil material has been compacted back into the trench, topsoil will be spread over the spoil storage and pit area, water bars installed, and reseeded. Care must be taken to not block drainage ditches.

For roads on slopes less than 10% a minimum of six inches of topsoil will be stripped from the construction area and placed in berms by sidecasting with a grader.

After access construction, the topsoil will then be spread back onto the road out slopes and cut slopes.

### ROADS

Recognized roads, as shown on the Rock Springs District Office Transportation Plan, will be used when the alignment is acceptable for the proposed use. Generally, roads will be required to follow natural contours; be constructed in accordance with standards as described in BLM Road Standards and BLM Manual section 9113; and be reclaimed to BLM standards.

Access roads will be constructed to the standard necessary to accommodate their intended functions. All roads in the oil field will be treated as "all weather roads." Unless the road sub grade material has enough gravel in it as determined by the authorized officer (A) all "all weather roads" will be gravelled with 2 inch pit run or crushed gravel. All permanent roads constructed by non-government entities across public lands must be designed by or under the direction of a licensed professional engineer. Soil compaction is required during road construction and culvert installation.

Authorized users are responsible for preventive and corrective road maintenance on all roads associated with field operations. This includes crowning, cleaning ditches and drainage facilities, culvert installation, graveling, dust abatement, or other requirements as directed by the AO.

Riprap will be required at the inlet and outlet of all culvert installations. The minimum size will be determined by the AO's representative.

Surface runoff and sedimentation control will be incorporated in all access road design in accordance with BLM Manual 9113 guidelines and installed as approved by the A.O. Road grades, ditches, culverts, sediment traps, material cut and fill, and topsoil and spoil areas will be designed and located in the field prior to construction.



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Access road culvert location and spacing will be approved by the AO using BLM Road Standards Manual 9113 Illustration 9 "Recommended Spacing for Lateral Drainage Culverts in Various Soil Types," shown below. The culvert spacing shown in feet under the erosion index of 10 to 40 will be used.

To control or reduce sediment from roads, guidance involving proper road placement and buffer strips to stream channels, graveling, proper drainage, seasonal closure, and in some cases, redesign or closure of old roads will be developed when necessary.

On newly constructed roads and permanent roads, the placement of topsoil, seeding, and stabilization will be required on all cut and fill slopes unless conditions prohibit this (e.g., rock). No unnecessary side-casting of material (e.g., maintenance) on steep slopes will be allowed.

Snow removal plans may be required for access which have winter use so that snow removal does not adversely affect drainage systems, reclamation efforts or other resources adjacent to the road.

Reclamation of abandoned roads will include reshaping, recontouring, resurfacing with topsoil, installation of water bars, and drill seeding on the contour. The removal of structures such as bridges, culverts, cattleguards, and signs usually will be required. Stripped vegetation will be spread over the disturbance for nutrient recycling, where practical. Fertilization or fencing of these disturbances will not normally be required. Additional erosion control measures (e.g., fiber matting) and road barriers to discourage travel may be required.

### Spacing for Drainage Laterals

#### Recommended Spacing for Lateral Drainage Culverts in Various Soil Types\*

Soil Types	EROSION INDEX			
	10	20	30	40
Silty sands, sand-silt mixtures, inorganic silts and very fine sands, silty or clayey fine sands	X_____X			
Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts, organic silts and organic silty clays or low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			X_____X	

\*Unified Soil Classification

Road Gradient in percent	Erosion Index			
	10	20	30	40
2	900'	1225'		
3	600'	815'	1070'	1205'
4	450'	610'	800'	905'
5	360'	490'	640'	725'
6	300'	410'	535'	605'
7	255'	350'	455'	515'
8	225'	305'	400'	450'

## WELL PADS AND FACILITIES

Prior to construction, the proposed pad location will be surveyed and staked and all erosion control design considerations will be reviewed (See Operating Order #1 for required engineering and design information).

The well pads will be laid out so that they are parallel to the contour and the pit is uphill whenever possible (H<sub>2</sub>S wells may require an exception). The drill pads will be designed and constructed to disturb the smallest practicable area.

All cut and fill slopes will be staked out at least every 50' on slopes with greater than 3' cut and /or



## APPENDIX A

fill to identify where topsoil will be removed. Spoil storage areas also must be staked so topsoil can be stripped and stored prior to any other dirt work. All cut and fill work will be balanced to minimize excess spoil material required during pad construction.

If excess spoil exists it will have to be incorporated into the pad fill slope or incorporated into the pad by compacting the spoil in six inch lifts using water and rubber tire vehicles and/or sheep's foot rollers. The areas of the pad that will support the drill rig and any other heavy equipment will be compacted to 95% maximum density as determined by AASHTO test T99.

All precautions necessary to stabilize structures will be taken during construction.

During the construction phase, interceptor ditches will be installed above the cut, where necessary. Collector ditches and sediment control structures, designed for a 10-year/24 hr event, may be required below the fill. Water, with a flow less than the 10-year/24 hr storm event, will be diverted and/or collected before being discharged from the disturbed area.

If excess spoil is generated during the construction phase it will be placed in designated areas and stabilized.

Qualified supervision will be provided during the installation of all erosion control structures including the construction of berms, dikes, trenches and the outslope fill.

No surface disturbance is allowed on slopes in excess of 25 percent unless erosion controls can be ensured and adequate revegetation is expected. Detailed engineering proposals, revegetation and restoration plans and a site specific environmental analysis will be required in these areas.

On producing locations spoil material will be replaced as close to the original contours as the placement of production facilities allows. Operators will be required to reduce cut and fill slopes to 3:1 or less. In those areas where final spoil grading is not possible, spoil will be graded to a gentle slope capable of maintaining a temporary vegetation cover for erosion control. Terraces or elongated water breaks (erosion control measures) will be required after slope reduction. Facilities will be required to approach zero runoff from the location until the area is stabilized to avoid contamination and water quality degradation downstream. All unused portions of facilities on producing well locations will be reduced to 3:1 slopes or less, resurfaced with topsoil and seeded with soil stabilizing species. Topsoil will be taken from the storage pile and

spread six inches deep onto the unused portion and chiselled on the contour.

On well pads and larger locations, special attention will be given to sections of the surface use plan covering reclamation. This plan will include objectives for successful reclamation including: soil stabilization, plant community composition, and desired vegetation density and diversity.

## PIPELINES AND COMMUNICATION LINES

Existing crowned and ditched roads will be used for access where practical to minimize surface disturbances. Pipelines are to follow new or existing roads or existing buried pipelines where it is practical. The pipeline trenches will not be placed in the access road borrow ditches unless no other reasonable alternative is available.

Generally, pipelines will be laid on the surface when slopes are over 25 percent and where rock outcrops are crossed. When possible pipelines should be built perpendicular to the contour in order to minimize the amount of area required for construction.

Clearing of pipeline and communication line rights-of-way will be accomplished with the least degree of disturbance to topsoil. Vegetation removed from the right-of-way will also be required to be spread to provide protection, nutrient recycling, and a natural seed source.

To promote soil stability, the compaction of spoil material free of vegetative material back into pipeline trenches in 8" lifts will be required. The soil berm above the pipeline trench shall not settle below the original ground surface or rise any more than 3" above it. Any areas that do not meet this requirement will have to be brought in compliance and reseeded. Water bars, mulching, and terracing will be required, as needed, to minimize erosion. Instream protection structures (e.g., drop structures) may be required in drainages crossed by a pipeline to prevent erosion.

The fencing of linear disturbances near livestock watering areas (distance determined on site-specific basis) may be required.

If linear facilities follow the same right-of-way for all or part of the route, they will generally be required to be constructed so that only one reclamation effort is required. Generally, they will be required to be constructed either concurrently or during the same field season.



# GEOPHYSICAL OPERATIONS

All of the standard practices for surface disturbing operations will apply to geophysical operations. The most critical management practice is compliance monitoring during and after seismic activity. Compliance inspections during the operation ensure that stipulations are being followed. Compliance inspections upon completion of work ensure that the lines are clean and the drill holes are properly plugged.

# RECLAMATION

Reclamation will be required on all disturbed areas. On roads left intact for access purposes, the stabilization of all disturbed areas, except the running surface, will be required.

Reclamation (by the operator or grant holder) will be initiated as soon as possible after a disturbance occurs. Construction of erosion and runoff control measures and placement of topsoil will be required after recontouring. Continued efforts will be required until satisfactory vegetation cover is established and the site is stabilized.

Site-specific reclamation plans will identify and provide reclamation erosion control methods for potential surface water impact for pipeline stream crossings. Stream channels will be restored to pre-construction grade and stabilized using appropriate methods, such as riprap, gabions and bulkhead retaining walls, timber, hay bales, and silt fences.

The collection and analysis of soil samples from disturbed areas may be required as part of reclamation planning to determine appropriate seed mixtures, and nutrient deficiencies. Soil testing and reports will be the responsibility of the grantee or lessee. Testing (as determined by BLM) may include: Ph, mechanical analysis, salt, total dissolved solids, nitrogen, phosphorus, and (or) potassium content.

Fertilization may be required if there is evidence of a nutrient deficiency. If needed to produce adequate germination and growth, the topsoil and selected seed species would be inoculated with soil microorganisms. The site will be drill seeded or broadcast (if slopes exceed 30 percent or contain 35 percent surface rock content).

Coarse materials with large voids will be compacted or covered with fine textured spoil material prior to topsoil placement to prevent sifting of topsoil into the spoil.

Severely compacted soils will be ripped to a depth of two feet with two foot centers in order to gain a more desirable seed bed.

During the operational life of a facility, (e.g. producing well, manifold, microwave tower, block valve, etc.), disturbed surface area not needed for operations will be reclaimed. This will entail spreading stockpiled spoil materials unto the areas to be reclaimed and then spreading stockpiled topsoil over the spoil. The areas will then be seeded and mulched as specified.

Stockpiled spoil will be replaced immediately after abandonment of surface facilities. Spoil and topsoil replacement will be completed at the first appropriate time during the following field season (May - October) to allow for fall seeding and mulching.

Grading may be required to improve steep, long and/or rough slopes in preparation for seed bed manipulations and planting.

In particular, grading will be used to blend cut-and-fill slopes with adjacent undisturbed areas while minimizing slope length, improving stability, reducing runoff, and decreasing erosion. Grading will provide for uniform distribution of spoil and topsoil. Grading will be used to implement one or more of the following specialized techniques; slope rounding, bench grading, stair-step grading, contour furrowing and berm placement on top of cut or fill slopes.

Snow fences, placed to increase snowfall depth over a reclaimed area, and reshaping to create shallow depressions (to catch surface runoff) may be required in areas receiving 10 inches or less of annual precipitation.

Reclaimed well sites, including sensitive areas along linear right-of-ways, will be fenced to protect the revegetated area from damage due to domestic and wild animals and off-road vehicles. All fencing will be done in accordance with the BLM fencing manual and Wyoming State Laws on legal fencing in effect at the time of reclamation. Fences will be kept in a usable condition until reclamation has been accepted by the authorized officer. After reclamation has been approved and the fences have been removed, the authorized officer can then release the operator or grantee from any further liability.

Off-road vehicle barriers will be installed, where necessary, and will consist of boulders, pylons, brush piles or other feasible barriers as required on a site-specific basis.

## Seeding

Only plant species adaptable to local soil and climatic conditions will be used in revegetation efforts. On all areas to be reclaimed, seed mixtures will be required to be site-specific and will be required to include species promoting soil stability. Livestock palatability and wildlife habitat needs will be given consideration in seed mix formulation. Interseeding,



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secondary seeding, or staggered seeding may be required to accomplish revegetation objectives. During rehabilitation of areas in important wildlife habitat, provision will be made for the establishment of native browse and forb species, if determined to be beneficial for the habitat affected.

Topsoil will be distributed uniformly on the area to be reclaimed. If there is between 2 to 3" of topsoil available for reclamation, it will be mixed with the top 3" of spoil prior to seeding the site. If 4" to 6" of topsoil is available no mixing will be required. Following topsoil application, seed bed preparation procedures will be determined on the basis of the physical and chemical characteristics of the topsoil and the physical nature of the site itself. A friable, but firm seed bed will be required.

Final seed bed preparation will be scheduled for completion immediately prior to seeding to maximize seeding effectiveness and seedling establishment. If top soil spreading is completed on a site during Spring and seeding is going to be delayed until fall, a suitable cover crop (an annual grass) will be broadcast seeded for stabilization and weed control.

All disturbed areas will be seeded using a drill equipped with a depth regulator. All seed will be drilled on the contour. The seed will be planted between one-quarter and one-half inches deep. Where drilling is not possible (too steep or rocky), the seed will be broadcast and the area raked or chained to cover the seed. If the seed mixture is broadcast the listed rate will be doubled. The seeding shall be repeated until a satisfactory stand, as determined by the AO, is obtained.

Each operator will submit the seed certification tags from each bag of seed used, upon request of the AO. In addition, the company will submit a list of what species were actually seeded and the actual application rate for each site.

The following are representative seed mixtures and rates that will be used. The seeding rate will generally be 12 - 15 lbs/acre. The seeding rate will be doubled if the seed is broadcast.

**SITES WITH TOPSOIL AVAILABLE:** (Soil amendments and mulch may be required but not normally.)

- A. Dry saline sites and shale slopes (areas with a pH between 8.2 and 9) Vegetation present: Greasewood, Shadscale, Gardner Saltbush.

Species	lbs/acre
Rosana Western Wheat	6
Pubescent Wheat	6
Winter Fat	2*
Fourwing Saltbush	1
Gardner Saltbush	1*
<b>Other possibilities</b>	
Saltgrass	
Alkali Sakaton	
Russian Wild rye**	

\* Plant only if present in the area.

\*\* Plant on saline sites with slopes of 5% or less.

- B. Dry loamy sites (areas with pH of 8.2 or less and less than 12 inches of moisture) Native vegetation is commonly Wyoming big sage and thickspike wheatgrass.

Species	lbs/acre
Thickspike Wheatgrass	6
Rosana Western Wheatgrass	6
Indian Ricegrass	2
Great Basin Wild Rye	1-2
Fourwing Saltbush	1-2
Wyoming Big Sage	1-2
Winter Fat	1-2*
<b>Other possibilities</b>	
Blue bunch wheat grass	
Needle and Thread	
Bluebunch Wheatgrass	



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- C. Loamy sites (Above 12 inches of moisture; pH of 8.2 or lower). Vegetation is usually Needle and Thread, Thickspike, Bluebunch Wheatgrass, and Wyoming Big Sagebrush.

Species	lbs/acre
Thickspike Wheatgrass	6
Smooth brome	6
Pubescent wheatgrass	1
Blue Bunch wheatgrass	1-2
Stream Bank wheatgrass	1-2
Wyoming Big Sage	1-2
Intermediate Wheatgrass	1-2
BitterBrush	1-2
Snowberry	1-2*

- D. Mountain Shrub - deep loamy soils with 14 - 18 inches of moisture.

Species	lbs/acre
Smooth Brome	5
Intermediate Wheatgrass	4
Slender Wheatgrass	2
Big Bluegrass	1
Mountain Brome	2
Blue Bunch Wheatgrass	1
Basin Wild Rye	1
Mountain Mahogany	1-2
Service Berry	1-2
Bitter Brush	1-2

- E. Aspen Conifer - higher areas or north facing slopes with 16 - 20 inches of moisture.

Species	lbs/acre
Smooth Brome	6
Slender wheatgrass	2
Orchard Grass	2
Timothy	2
Alpine Timothy	1
Intermediate Wheat	2
Meadow Foxtail	1
Sticky Geranium	1

**SITES WITHOUT TOPSOIL AVAILABLE OR WITH HIGH SALINITY:** (Soil tests required prior to seeding and added soil amendments will be required in most cases.)

- A. Moderate pH and Salinity.

Species	lbs/acre
Crested Wheatgrass	12-15
Slender wheatgrass	3
Smooth Brome grass	2
Streambank wheatgrass	2



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- B. Highly saline sites (EC=10 or greater). Species listed in accordance with their ability to tolerate high salinity. (Other soil amendments will be required in most cases.)

Species:	lbs/acre
Tall Wheatgrass	6
Slender wheatgrass	6
Tall Fescue	6
Western Wheatgrass	6
Russian Wildrye	12*

\*Seed alone and on slopes less than 5%.

Follow-up soil testing and/or seeding or corrective erosion control measures will be required on areas of surface disturbance which experience reclamation and/or erosion failure.

Hydroseeding may be required on steep, gravelly slopes which require the seed to be "anchored" onto the soil surface prior to a mulch treatment. Care will be taken to assure that the solution is not harmful to the seed mix components.

### Treatments

Mulches will be applied on seed beds with high soil erosion potential or where seed bed microclimate may limit seedling establishment. Any mulch used will be free from mold, fungi, or noxious weed seeds. Mulch may include native hay, small grain straw, wood fiber, live mulch, cotton, jute, synthetic netting, and rock. Straw mulch should contain fibers long enough to facilitate crimping and provide the greatest cover. Some type of matting may be required in more severe conditions such as steep slopes, sandy soils, and other poor soil sites which need site condition modifications to enhance seeding success.

The grantee or lessee will be responsible for the control of all noxious weed infestations on surface disturbances. Control measures will adhere to those allowed in the Rock Springs District Noxious Weed Control EA (USDI 1982a) or the Regional Northwest Area Noxious Weed Control Program EIS (USDI 1987).

Ripping and chiseling will be used to break up compacted soils, increase water penetration, promote root growth, and control erosion. Ripping (2' deep) will normally be used on compacted spoil material and old road beds prior to spreading topsoil. Chiseling on the contour (12" deep) will be done after the site is contoured, ripped, the topsoil is spread, and soil amendments are added.

On sites where quick establishment of shrub and/or small tree species is desirable, bare rooted and containerized species will be hand planted to supplement drilling or broadcast seeding. Shrub species will be planted in areas where wildlife forage is essential, mass slope failure is possible, or along stream crossing to facilitate site stability and wildlife habitat restoration.

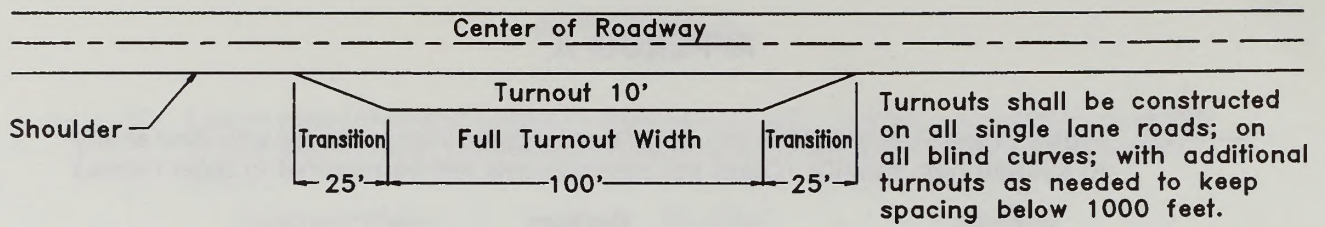
### AIR QUALITY PROTECTION MEASURES

As projects are planned that include possible major sources of air pollutant emissions, special air quality protection related stipulations are added to BLM permits and rights-of-way grants. In addition, the BLM coordinates with the Wyoming Department of Environmental Quality/Air Quality Division (DEQ/AQD) during the process of analysis that may lead to the issuance of permits to construct emission sources. This coordination often results in the technical review of applications for permits and/or identification of additional stipulations to be applied to these permits.

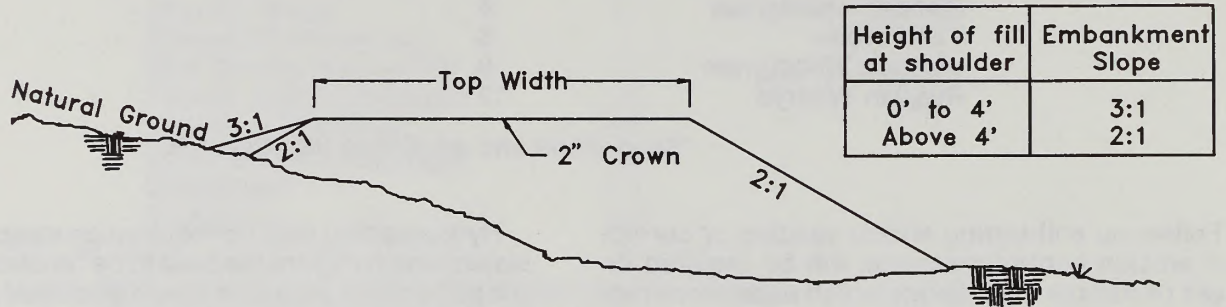
The release of hazardous air contaminants, particularly the emissions from sour natural gas sweetening plants (a process used to remove H<sub>2</sub>S from natural gas resulting in the emission of sulfur dioxide), is a public concern. BLM requires industry to prepare detailed analyses of risks involved with the development of sour gas pipelines and treatment facilities. These analyses are designed to project impacts both to the public and to resource values. Plant siting will be scrutinized to provide for public safety and to ensure that only areas with the least potential for the transport of pollutants to the wilderness are considered.

To aid in achieving these goals, BLM will consult with the State of Wyoming, the U.S. Forest Service, industry, and the public to ensure that the most technically sound, environmentally balanced, and economically feasible decisions are made.

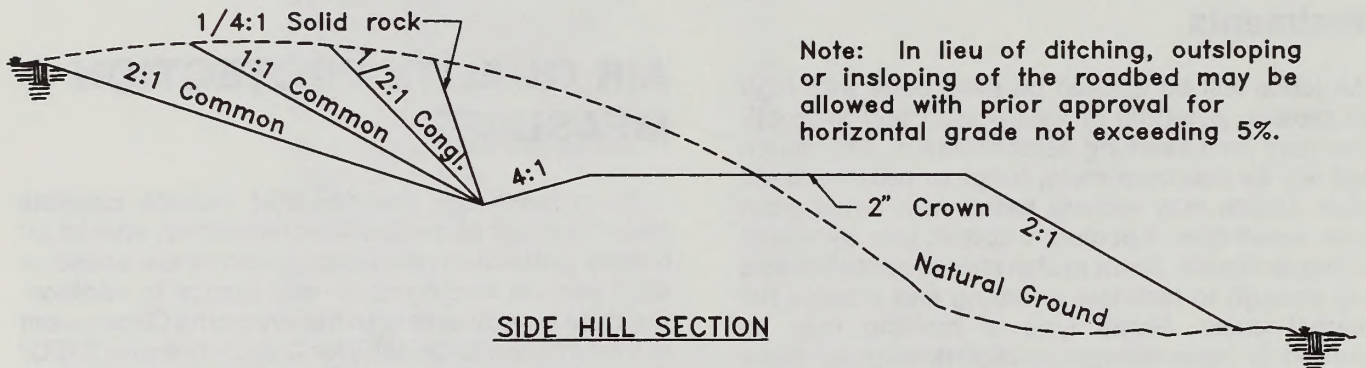




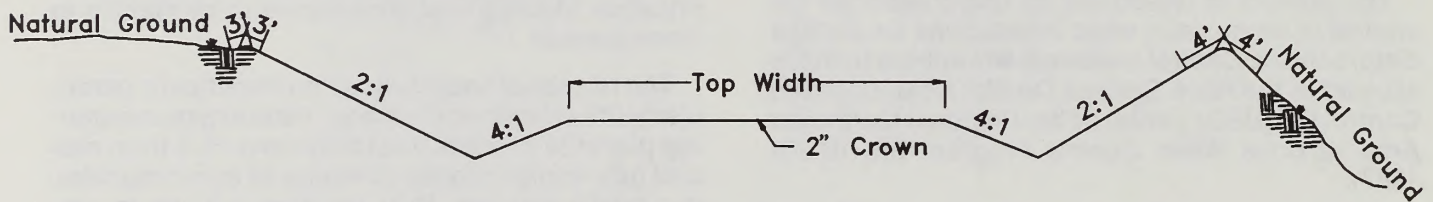
TYPICAL TURNOUT PLAN



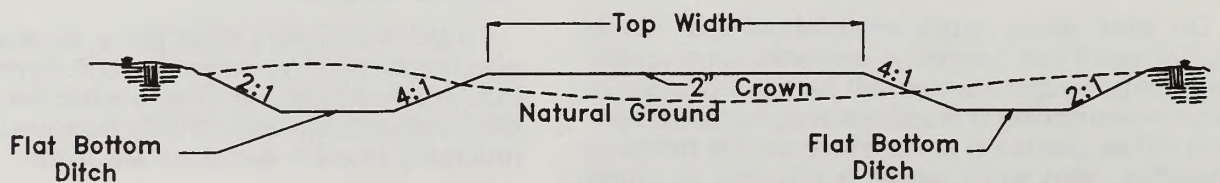
EMBANKMENT SECTION



SIDE HILL SECTION



CUT SLOPE ROUNDING



FLAT BOTTOM DITCH

## TYPICAL ROAD SECTION

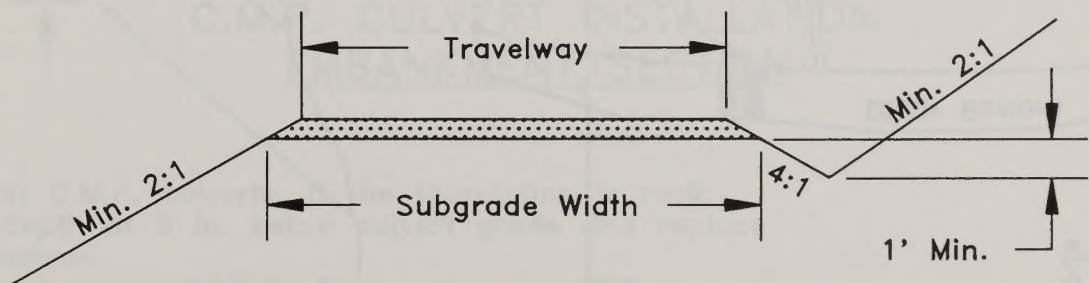


# MINIMUM ROAD STANDARDS

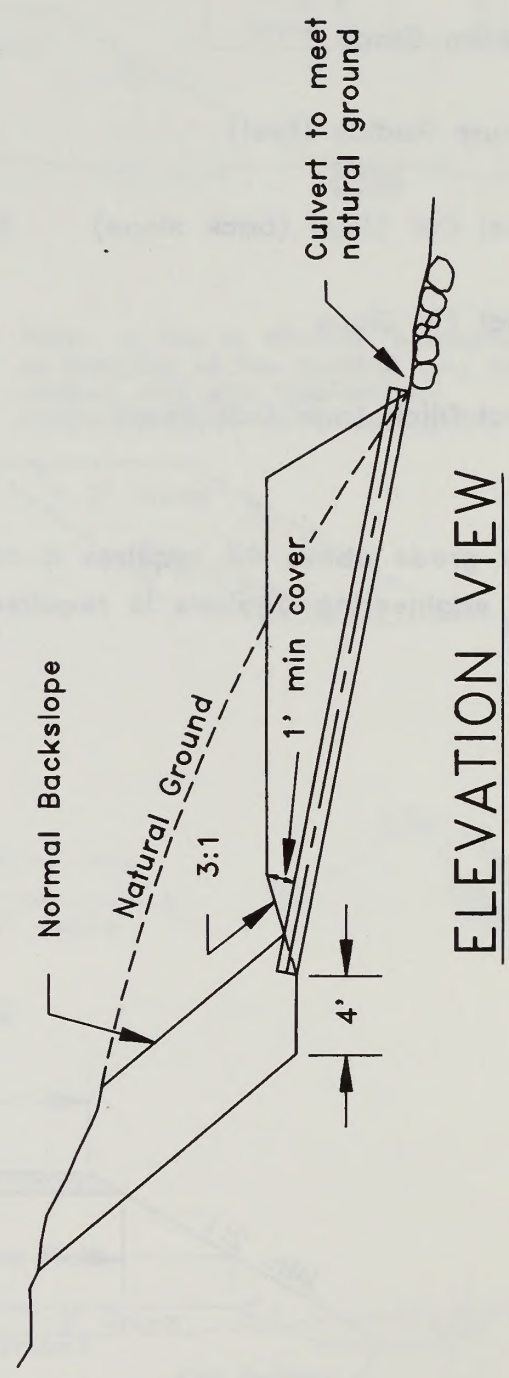
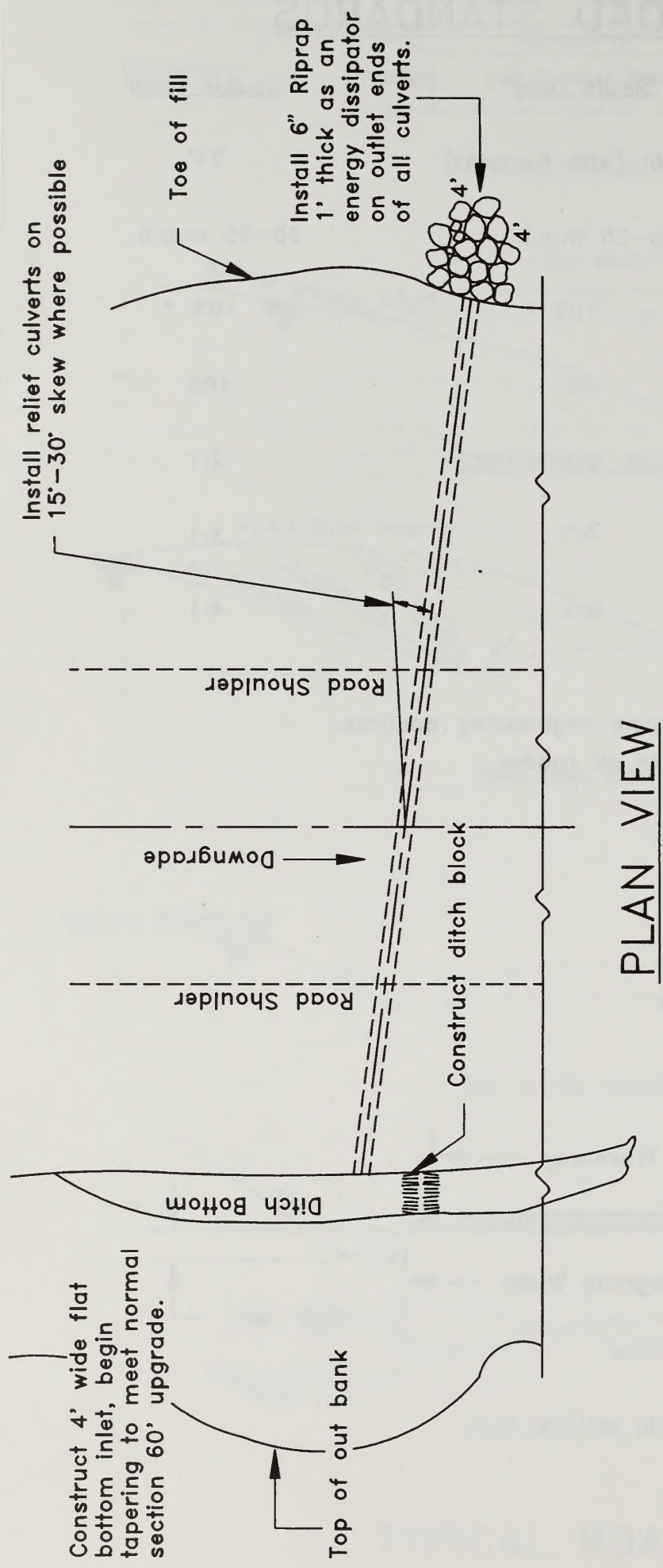
	<u>Single Lane</u>	<u>Double Lane</u>
Width - subgrade	16' (with turnouts)	24'
Average Design Speed	15-25 m.p.h.	25-35 m.p.h.
Maximum Grade	10% *	10% *
Minimum Radius (feet)	65	100
Normal Cut Slope (back slope)	2:1	2:1
Normal Fill Slope	3:1	3:1
Normal Ditch (one foot deep)	4:1	4:1

\* Any grade above 8% requires a complete engineering analysis.

An engineering analysis is required for all roads.

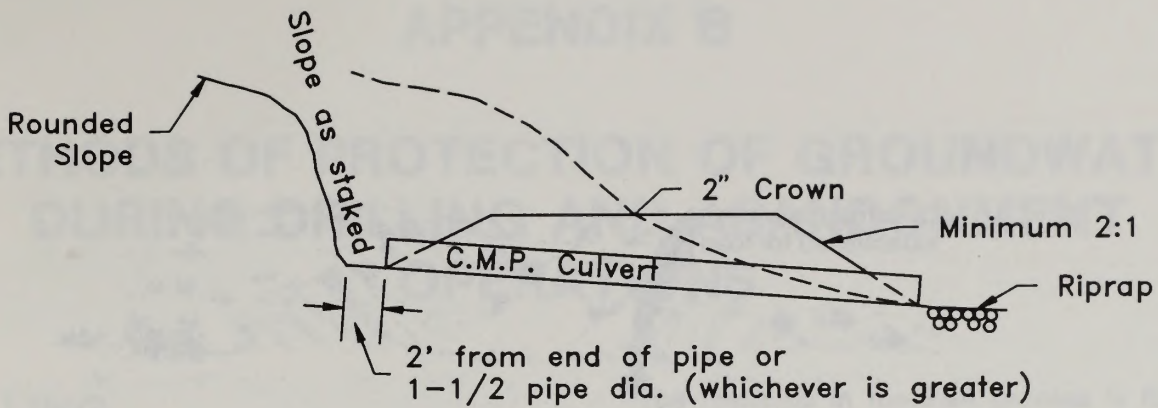




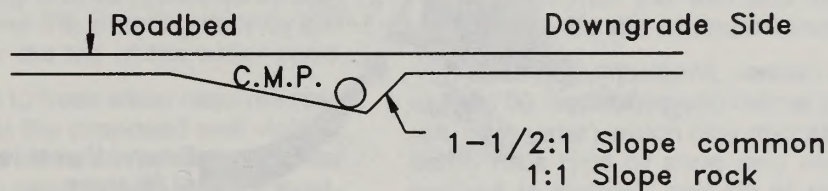


# CROSS DRAIN

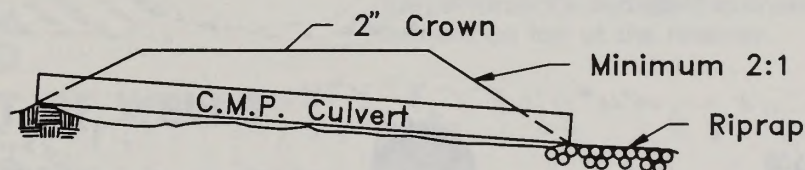




### C.M.P. CULVERT INSTALLATION CUT SECTION



### C.M.P. CULVERT INSTALLATION DITCH CONSTRUCTION AT SIDE HILL



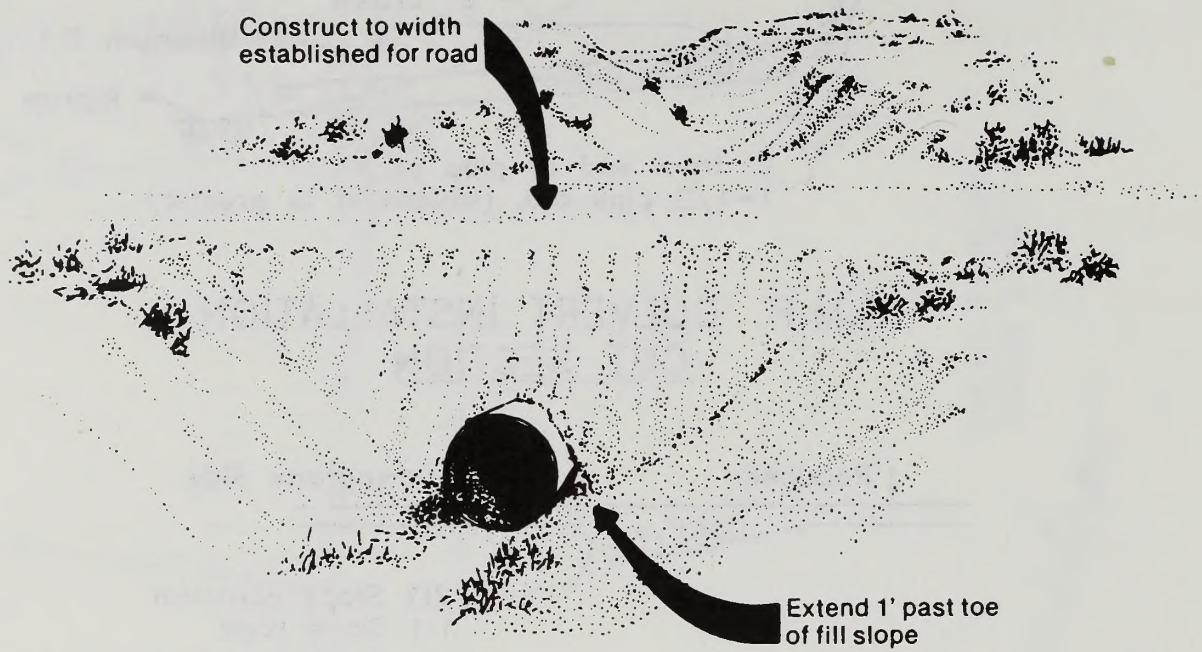
### C.M.P. CULVERT INSTALLATION EMBANKMENT SECTION

#### General Notes:

1. In bedding of C.M.P. culverts, if the foundation is rock, excavate to depth of 8 in. below culvert grade and replace with earth cushion.
2. Minimum cover over culvert is 1'.
3. Minimum culvert diameter 18".
4. Minimum culvert spacing:
  - (a) 1- 2% grade - 1000 feet minimum
  - (b) 2- 4% grade - 800 feet minimum
  - (c) 4- 6% grade - 600 feet minimum
  - (d) 6- 8% grade - 400 feet minimum
  - (e) 8-10% grade - 250 feet minimum
5. Maximum grade 10%.

TYPICAL CULVERT  
CONSTRUCTION





ACCEPTABLE



NOT ACCEPTABLE



## **APPENDIX B**

# **METHODS OF PROTECTION OF GROUNDWATER DURING DRILLING AND ABANDONMENT OPERATIONS**

### **DRILLING**

When processing an Application for Permit to Drill (APD), the BLM geologist must identify the maximum depth of usable water as defined in Onshore Oil and Gas Order #2. Usable water is water containing 10,000 parts per million or less of total dissolved solids. Water of this quality is to be protected by casing cemented in place over the water zone or by circulating cement up over the top of the water zone.

Determining the depth to fresh water requires specific water quality data in the proposed well vicinity or the use of electric logs from nearby wells. If water quality data or logs from nearby wells are not available, the area within a 2-mile radius of the proposed well is checked for water wells. If usable water is identified, surface casing is required to be set below the deepest fresh water zones found. In some cases, if the usable water is found at a depth that is too deep to set surface casing, the operator is required to circulate cement behind the production casing to a point high enough to isolate and protect the water zone.

### **PLUGGING AND ABANDONMENT OF WELLS**

The purposes of plugging and abandoning (P&A) a well are (1) to prevent fluid migration between zones, (2) to protect minerals from damage, and (3) to restore the surface area. Each well must be handled individually due to a combination of factors, including geology, well design limitations, and specific rehabilitation concerns. Therefore, only minimum requirements can be established initially. These would be modified for the individual well.

The first step in the P&A process is filing the Notice of Intent to Abandon (NIA). The NIA must be filed and approved before plugging a well. Verbal plugging instructions can be given for plugging current drilling operations, but a Subsequent Report of Abandonment (SRA) must be filed after the work is completed. If usable fresh water is encountered while a well is being drilled, the BLM may assume responsibility for the well and the operator will be reimbursed for the attendant costs.

In open hole situations, cement plugs must extend at least 50 feet above and below zones (1) with fluid (oil, gas, water) which may migrate, (2) of lost circulation (this type of zone may require an alternate method to isolate), and (3) of potentially valuable minerals. Thick zones may be isolated using 100-foot plugs across the top and bottom of the zone. In the absence of productive zones and minerals, long sections of open hole may be plugged with 150-foot plugs placed every 2,500 feet. In cased holes, cement plugs must be placed opposite perforations and extending 50 feet above and below except where limited by plug back depth. It is also acceptable in cased holes to cement squeeze the perforations through a cement retainer placed above the perforations and leave approximately fifty feet of cement on top of the retainer.







# APPENDIX C

## CULTURAL RESOURCES PROCESS

### CULTURAL RESOURCE MITIGATION GUIDELINE

When a proposed discretionary land use has potential for affecting the characteristics which qualify a cultural property for the National Register of Historic Places, mitigation is appropriate. In accordance with Section 106 of the Historic Preservation Act, procedures specified in 36 CFR 800 will be used, in consultation with the Wyoming State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP), in arriving at determinations regarding the need for and type of mitigation to be required.

### GUIDANCE

Avoidance is the preferred strategy for treating potential adverse effects to cultural properties. If avoidance involves project relocation, the new project area may also require cultural resource inventory. If avoidance is imprudent or unfeasible, appropriate mitigation may include excavation (data recovery), stabilization, monitoring, installation of protective barriers or signs, or other physical and administrative measures.

Reports documenting results of cultural resource inventory, evaluations, and the establishment of mitigation alternatives (if necessary) shall be written according to standards contained in BLM Manuals, the cultural resource permit stipulations and in other policy issued by the BLM. These reports must provide sufficient information for Section 106 consultation. Reports shall be reviewed for adequacy by the BLM archaeologist. If cultural properties on, or eligible for, the National Register are within the area of potential effect and cannot be avoided, the Authorized Officer shall begin the Section 106 consultation process in accordance with the procedures in 36 CFR 800.

Mitigation measures shall be implemented according to a mitigation plan approved by the Authorized Officer. Such plans are usually prepared by the applicant's contract archaeologist according to BLM specifications. Mitigation plans will be reviewed as part of Section 106 consultation for National Register eligible or listed properties. The extent and nature of recommended mitigation shall be commensurate with the significance of the cultural resource

and the anticipated extent of damage. Costs for mitigation will be borne by the applicant. Mitigation must be cost effective and realistic. It must consider project requirements and limitations, input from concerned parties, and be approved or formulated by BLM.

Mitigation of paleontological and natural history sites will be treated on a case-by-case basis. Factors such as site significance, economics, safety, and project urgency must be taken into account when making a decision to mitigate. Authority to protect (through mitigation) such values is provided for in FLPMA, Section 102(8).

### CULTURAL RESOURCES PROCESS

The attached figure depicts the following narrative of the cultural resources process.

1. The BLM may require a cultural survey of a proposed project area. The survey is conducted by either BLM personnel or an outside contractor. A survey report is produced and copies provided to BLM and the State Historic Preservation Officer (SHPO). The BLM uses the report as a basis for National Register evaluations of sites located, determining the effect of the project on any significant cultural resources, and the need to mitigate any impacts to significant resources.

2. The BLM specialist or cultural resource contractor plans the survey, conducts background research on the project area (Class I Inventory), reviews regional overviews and other documents for pertinent previous research, terrain and field conditions in the project area. Before beginning fieldwork, the contractor conducts a file search at the SHPO records office, and if necessary, at the local BLM office.

**2A.** If the file search reveals that the project area has been adequately inventoried, or if the project area has no site potential, a field survey (Class III Inventory) may not be warranted. The responsibility for determining the need for a Class III inventory rests with the BLM, in consultation with the SHPO.

**2B.** The results of the file search are documented in a report that should contain complete bibliographic references of the previous surveys and summary of previous sites located.



## APPENDIX C

**3.** The BLM or contractor conducts the Class III inventory of the project area. If standard inventory requirements would not apply, the overall field methodology, including survey intensity and aerial limits, is determined by the BLM in consultation with the SHPO.

**3A.** If no sites are discovered during the Class III inventory, and if no previously recorded sites are located in the project area, the negative results of the survey are documented in a Class III report. Cultural resource clearance is obtained and the project proceeds (subject to other resource considerations, as applicable).

**3B.** If sites are discovered during the survey, or if previously recorded sites are located in the project area, Steps 4 through 9 are followed.

**4.** Each site located is recorded on an Intermountain Antiquities Computer System (IMACS) site form.

**5.** Each new site and each previously recorded site in the area of effect is evaluated for National Register eligibility. Limited testing should be conducted as necessary. Sites that are recorded but not located in the area of effect may be listed as unevaluated for National Register eligibility.

**6 & 6A.** If a site is not eligible for the National Register, no further work (i.e., testing, monitoring, excavation, or avoidance) is usually required. If the site contains information significant enough to warrant further work, the site should be evaluated as eligible (see Step 7). The evaluation of noneligibility is documented and a recommendation of "no further work" is made in the report.

**7 & 7A.** If a site is evaluated as eligible for the National Register, the reasons for its eligibility must be documented, with a detailed description of how

the site meets the Criteria of Eligibility (36 CFR 60.4). If a site is eligible because of its research potential or information content (36 CFR 60.4(d)) the report must document and discuss the site information content in terms of pertinent research questions which may be addressed.

**8.** The effect of the project on each eligible site is evaluated and documented. "Effect" is determined by applying the criteria in 36 CFR 800.5.

**8A1 & 8A2.** If there will be no effect, no further work at the site will be needed. This is documented in the Class III report (see Step 9).

**8B1.** If the impacts to the site will result in adverse effects, this is also documented in the Class III report (see Step 9).

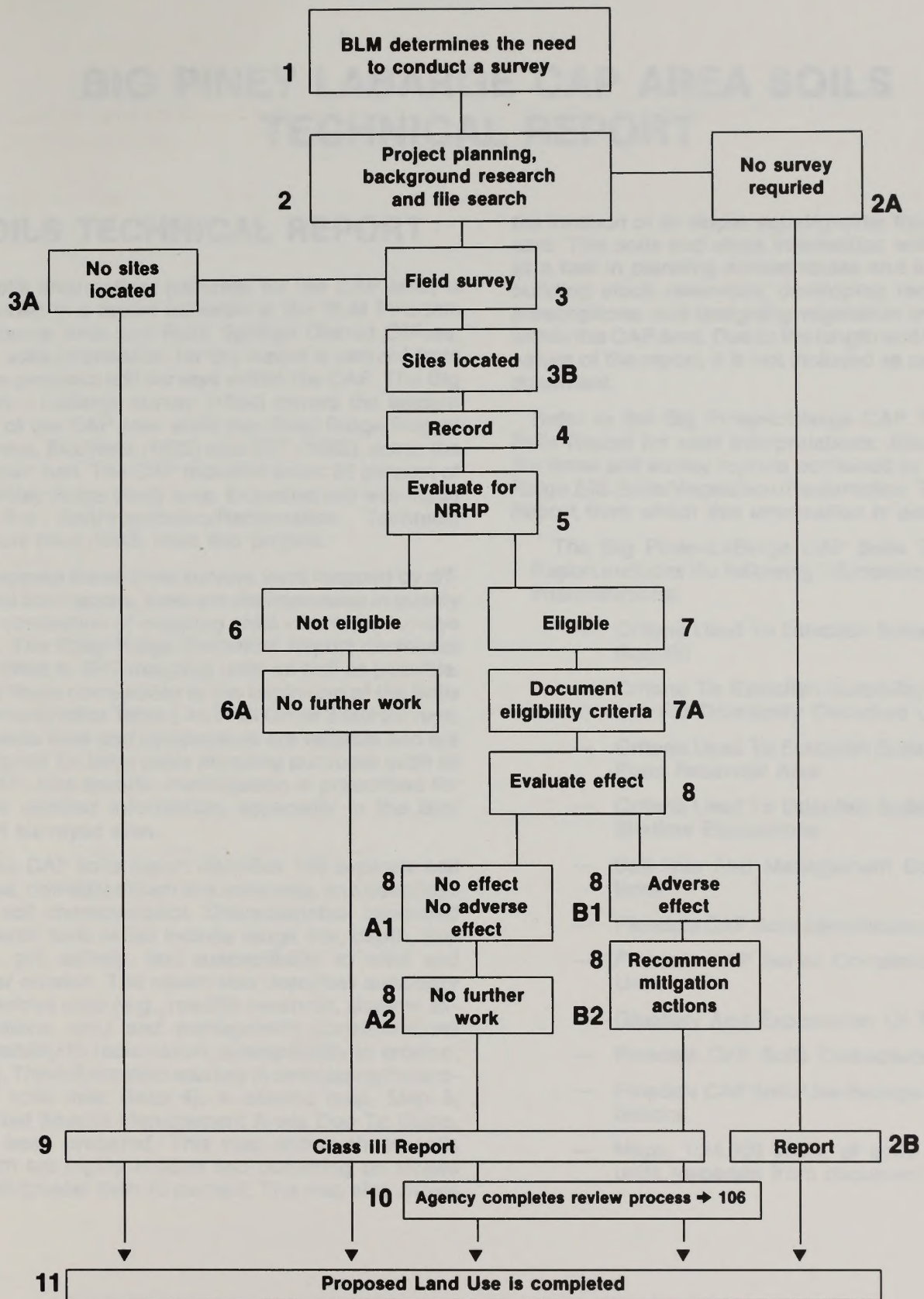
**8B2.** Recommendations to mitigate adverse effects should be directed at reducing or eliminating impacts to those qualities which make the site eligible for the National Register. Avoidance or in situ preservation are the preferred options. Data recovery is appropriate if avoidance or in situ preservation are not feasible or cost effective. Construction may be monitored under certain conditions.

**9.** A report is prepared documenting the results of Steps 1 through 8A2 and(or) 8B2 and copies of the report submitted to the BLM, the SHPO, and the applicant/land user.

**10.** The BLM, in consultation with the SHPO, and the Advisory Council on Historic Preservation use the information provided in Step 9 to carry the "106" review process to completion.

**11.** After the above process is completed, the proposed land use may be permitted with appropriate resource stipulations.





## CULTURAL RESOURCES PROCESS







# APPENDIX D

## BIG PINEY LABARGE CAP AREA SOILS TECHNICAL REPORT

### SOILS TECHNICAL REPORT

Soils information, gathered for the CAP area, is included in a report available at the BLM Pinedale Resource Area and Rock Springs District Offices. The soils information for the report is derived from three previous soil surveys within the CAP. The Big Piney - LaBarge survey (1984) covers the eastern half of the CAP area while two Riley Ridge Project surveys, Bio/West (1982) and ERT (1982), cover the western half. The CAP includes about 20 percent of the Riley Ridge study area. Extensive use was made of the Soil/Vegetation/Reclamation Technical Report (May 1983) from this project.

Because these three surveys were mapped by different contractors, there are discrepancies in quality and correlation of mapping units where the surveys join. The Riley Ridge Technical Report correlates Bio/West to ERT mapping units as well as possible. (See these correlations at the beginning of the Soils Characteristics Table.) As in all Order 3 soil surveys, the soils lines and components are variable and are designed for large scale planning purposes such as a CAP. Site specific investigation is prescribed for more detailed information, especially in the Bio/West surveyed area.

The CAP soils report identifies 100 separate soil series, correlates them to a soils map, and describes the soil characteristics. Characteristics described for each soils series include range site, depth, texture, pH, salinity, and susceptibility to wind and water erosion. The report also describes suitability to various uses (e.g., roadfill, reservoir, shallow excavations, etc.) and management considerations (suitability to reclamation, susceptibility to erosion, etc.). This information was key in developing the erosive soils map (Map 4). A second map, Map 5, entitled Special Management Areas Due To Slope, has been prepared. This map shows those soils which are highly erosive and occurring on slopes equal/greater than 10 percent. The map also shows

the location of all slopes equal/greater than 25 percent. This soils and slope information will be used as a tool in planning access routes and well pads, building stock reservoirs, developing reclamation prescriptions, and designing vegetation treatments within the CAP area. Due to the length and technical nature of the report, it is not included as part of this document.

Refer to the Big Piney-LaBarge CAP Technical Soils Report for soils interpretations. Also refer to the three soil survey reports contained in the Riley Ridge EIS Soils/Vegetation/Reclamation Technical Report from which this information is derived.

The Big Piney-LaBarge CAP Soils Technical Report includes the following information for soils interpretations:

- Criteria Used To Establish Suitability For Roadfill
- Criteria To Establish Suitability Of Topsoil For Drastically Disturbed Lands
- Criteria Used To Establish Suitability For Pond Reservoir Area
- Criteria Used To Establish Suitability For Shallow Excavations
- Soil Use And Management Considerations
- Pinedale CAP Soils Identification Legend
- Pinedale CAP Series Correlation - Map Unit
- Glossary And Explanation Of Terms
- Pinedale CAP Soils Characteristics
- Pinedale CAP Soils Use Ratings And Limitations
- Maps, 1:24,000 scale, of soils mapping units (separate from document)







## APPENDIX E

# SURFACE DISTURBANCE AND RECLAMATION CALCULATIONS

Number of Active Wells	- 1,080
Number of Abandoned Locations Being Reclaimed	- 125
Miles of Paved Road	- 52
Miles of Improved Road	- 540
Miles of Unimproved Road	- 30
Miles of Unnecessary Road To Be Reclaimed	- 110

### PERMANENT DISTURBANCE AND OTHER RELEVANT CALCULATIONS

#### Linear Disturbances:

Paved Roads using a 40-foot estimated width of disturbance

$$52 \text{ miles} \times 4.85 \text{ acres/mile} \times 0.67 \text{ BLM} = 252 \text{ acres}$$

Improved Roads using a 24-foot estimated width of disturbance

$$540 \text{ miles} \times 2.91 \text{ acres/mile} \times 1,571 \text{ acres}$$

Unimproved Roads using an 8-foot. estimated width of disturbance

$$30 \text{ miles} \times 0.97 \text{ acres/mile} = 29 \text{ acres}$$

Unnecessary Roads using an 16-foot average estimated width of disturbance

$$110 \text{ miles} \times 1.91 \text{ acres/mile} = 210 \text{ acres}$$

**SUBTOTAL FOR LINEAR DISTURBANCE = 2,062 acres**

#### Polygon Shaped Disturbances:

1,080 Active Wells using a 1.25 acre of permanent disturbance per well pad

$$1,080 \text{ wells} \times 1.25 \text{ acres/well} = 1,350 \text{ acres}$$

$$\text{TOTAL PERMANENT DISTURBANCE} = 1,350 \text{ acres} + 2,062 \text{ acres}$$

**SUBTOTAL PERMANENT DISTURBANCE = 3412 acres**

### AVERAGE PERMANENT DISTURBANCE PER ACTIVE WELL

3,412 acres of permanent disturbance

1,080 active wells on BLM-administered lands (as of 1990)

**AVERAGE PERMANENT DISTURBANCE PER ACTIVE WELL = 3 acres**



## APPENDIX E

### RECLAMATION OPPORTUNITIES

Potential to reclaim roads using a 16-foot estimated width of disturbance:

110 miles x 1.9 acres/mile = 210 acres

### TOTAL ACRES HABITAT TO BE LOST TO ENERGY DEVELOPMENT OVER THE NEXT 10 YEARS WITHIN THE CAP AREA BY ALTERNATIVE

<b>ALTERNATIVE A:</b>	= 900 acres lost
300 wells drilled x 3 acres/well	= 600 acres gained
200 wells abandoned x 3 acres/well	= 210 acres gained
110 miles of road reclaimed x 1.9 acres/mile	

**Net loss/gain habitat for ten year period = - 90**

<b>ALTERNATIVE B AND C:</b>	= 1,800 acres lost
600 wells drilled x 3 acres/well	= 600 acres gained
200 wells abandoned x 3 acres/well	= 210 acres gained
110 miles of road reclaimed x 1.9 acres/mile	

**Net loss/gain habitat for ten year period = - 990**

<b>ALTERNATIVE D AND E:</b>	= 2,700 acres lost
900 wells drilled x 3 acres/well	= 600 acres gained
200 wells abandoned x 3 acres/well	= 210 acres gained
110 miles of road reclaimed x 1.9 acres/mile	

**Net loss/gain habitat for ten year period = - 1890**

<b>ALTERNATIVE F:</b>	= 600 acres lost
200 wells drilled x 3 acres/well	= 600 acres gained
200 wells abandoned x 3 acres/well	= 210 acres gained
110 miles of road reclaimed x 1.9 acres/mile	

**Net loss/gain habitat for ten year period = + 210**



# APPENDIX F

## MONITORING

### OVERVIEW

To meet the objectives of the CAP, and conform with the Pinedale RMP, monitoring will be accomplished by BLM and/or required of operators (oil and gas, rancher, right-of-way applicants, etc.). Monitoring is a requirement provided for in the Code of Federal Regulations (40 CFR 1505.2(c) and 1503.3). The regulation, in its requirements relative to NEPA and Agency Decision making, states "...A monitoring and enforcement program shall be adopted and summarized where applicable for any mitigation" (1505.2(c)).

BLM will conduct extensive monitoring inspections of construction, drilling, and rehabilitation operations, through a compliance officer and/or interdisciplinary team, to ensure acceptable attainment of objectives. The monitoring inspections will be based upon the standards in Appendix B (Standard Practices Applied To Surface Disturbing Activities).

Specific monitoring that will be implemented includes oil and gas, wildlife, and forage.

### OIL AND GAS

Reclamation: All past, present, and future reclamation will be monitored to ensure the following goals have been met with regards to successful revegetation and restoration.

- Immediate site stabilization to limit wind and water erosion.
- Establishment of vigorous stands of desirable plant species to limit invasion by noxious weeds.
- Implementation of noxious weed control in cooperation with County Weed and Pest Control Agent.
- Establishment of vegetation consistent with livestock and wildlife needs.
- Reduction of visual contrast and enhancement of aesthetic values.
- Compliance with site-specific revegetation requirements.
- Regenerating and self-supporting vegetation.

Monitoring of a reclaimed area is a joint effort between the BLM and the operator. The BLM will inspect the site immediately after the initial seeding and the following fall for compliance with the reclamation requirements. The operator is responsible for notifying the BLM as soon as the site has met the reclamation objectives identified for the site. If the BLM agrees that the site's reclamation objectives have been met, the operator is released from any further reclamation responsibilities. If the BLM does not feel the reclamation objectives have been met, further treatment may be prescribed.

The reclamation monitoring goal for revegetation will be to adequately characterize ground cover and vegetation canopy cover, and to determine vegetation species occurrence.

This data will be compared to one of two acceptance criteria: 1) reclamation cover is 50 percent of pre-disturbance cover at 2 years, and 80 percent of pre-disturbance cover at 5 years; or 2) the total ground and canopy cover for the reclaimed site is 51 percent or greater. (This criterion is based on a vegetation, litter, and rocks percentage cover rating system of: Excellent = 81 - 100, Good = 61 - 80, Fair = 41 - 60, Poor = 21 - 40, and Very Poor = 0 - 20). These acceptance criteria are adaptations to methods used by the U.S. Forest Service, Regions 2 and 4.

Monitoring will consist of a step-point transect which will record ground and canopy cover from a minimum of 100 points in the reclaimed area. This data would be compared against acceptance criterion 2 (BLM Manual, Physical Resource Studies, 4412.14 D2 and 4).

To use acceptance criterion 1, a second transect would be run in the adjacent undisturbed vegetation recording ground and canopy cover on a minimum of 100 points. This cover data would be compared to the 2 year and 5 year predisturbance cover parameters.

During monitoring, species will be identified and recorded in the reclaimed area to determine the composition. This data will be compared with the species that were in the seeding requirements. Evaluations will be made of the effectiveness of the seeding effort and appropriateness of the seed mix.

Erosion condition ratings for the reclaimed sites will also be evaluated at the same time the vegetation is monitored. This will be done by visually assessing the amounts of soil movement, surface rock, pedestaling, flow patterns, and rills (BLM's Erosion Condition Class Rating system).



### ROADS

As a continuing monitoring effort all existing access roads will be continually evaluated to determine if they are: 1) still necessary, 2) safe, and 3) whether they have erosion problems. The roads will be reclaimed or maintained as is appropriate. It will be the responsibility of the authorized users to conduct preventative and corrective road maintenance, throughout the life of their operations, on the roads permitted for their use.

### WILDLIFE

The scheduling of wildlife monitoring activities is dependent upon the implementation of habitat improvement treatments. Specific monitoring practices will be as follows:

Mule deer distribution within the CAP area will continue to be monitored annually following the completion of the Wyoming Range Mule Deer Mortality Study. Classification will occur at a level adequate enough to obtain estimates of post-treatment mule deer densities during mid-winter. Mule deer classification activities will fall under the responsibility of the WGFD.

At least one permanent line intercept transect with a belt transect and permanent photo points will be established within each treatment area before and after treatment implementation. From these permanent transects post-treatment estimates of browse species canopy cover, browse species density by age class, and browse species hedging classes within each treatment area will be obtained. Monitoring intensity will be at least once every 3 years. These monitoring responsibilities will be shared jointly by BLM and WGFD.

Two permanent 0.05 acre (0.02 ha) exclosures (1 livestock exclosure, and 1 livestock and big game exclosure) will be established within the sagebrush-grassland, sagebrush-salt desert shrub, and mountain shrub-sagebrush types within the CAP area. Within these exclosures, all of the vegetative characteristics outlined will be monitored, as appropriate, at least once every 5 years. The construction and monitoring responsibilities will be shared jointly by BLM and WGFD.

Utilization levels within and adjacent to treated areas (key areas) will be monitored using currently accepted BLM methods. These monitoring responsibilities will be shared jointly by BLM and WGFD.

### RANGELAND

#### General

In conformance with the Pinedale RMP, monitoring studies will be installed on all "I" category allotments, and on "M" and "C" category allotments as needed. Monitoring intensity will be greater on "I" allotments than on "M" or "C" allotments.

Key areas have been identified for monitoring in this plan, but only for those pastures of North LaBarge Common and Calpet Common allotments, and then only for those pastures that lie within the CAP boundaries (see Table F-1). Key areas for the other pastures in these two allotments have been tentatively located and will be identified in forthcoming AMP revisions. Every effort will be made to include affected and interested parties throughout the monitoring period for these allotments. Pre-season and post-season range tours are customary with BLM Range Conservationist and LaBarge Roundup Association members. Utilization and distribution problems have been identified during these range tours over the past 3 years. This information was used to identify the key areas listed in Table F-1. These tours have been very beneficial in the drafting of this plan and should be continued at least through the time that this can be declared a successful and workable plan. The grazing permittees will be invited to participate in this monitoring effort to the extent that they see fit. In addition to the permittees, the following groups have been or will be invited to participate in the monitoring effort on these allotments:

Natural Resource Defense Council (NRDC)  
Wyoming Game and Fish Department  
National Wildlife Federation  
Wyoming Wildlife Federation  
U.S. Environmental Protection Agency

#### Monitoring Studies

The primary studies to be established are: actual use, utilization climate, trend, and observation. The timing suggested for these studies are important but personnel and funding limitations may require some modification in the frequency of data collection. All data and photos will be kept in individual analysis files for these allotments. The collection and evaluation of the data will be a joint effort by the livestock operators and BLM. Actual Use

Actual use data will reflect the actual dates and numbers of livestock grazed in a pasture or allotment. It will be obtained from the operator soon after the use is made (e.g., after pasture changes, moving



## APPENDIX F

**TABLE F-1**  
**MONITORING STUDIES TO BE ESTABLISHED**

Key Area <sup>1</sup>	Legal Description of Study	Utilization	Trend
<b>CALPET COMMON</b>			
<b>Calpet Pasture</b>			
Birch Creek	LOT 9 Sec. 2 T26N, R113W	X	
Calpet	NWNW Sec. 4 T26N, R113W	X	
<b>NORTH LABARGE COMMON</b>			
<b>Hogsback Pasture - Big Mesa (SW)</b>			
Water Tank	NESW Sec. 8 T27N, R113W	X	
<b>Wildcat Canyon Pasture - Big Mesa (SE)</b>			
Bird Draw	SWNE Sec. 12 T27N, R113W	X	
<b>Dry Piney Pasture - Big Mesa (NW)</b>			
Dry Piney	NESE Sec. 32 T28N, R113W	X <sup>2</sup>	X <sup>3</sup>
<b>Yose Canyon Pasture - Big Mesa (NE)</b>			
Yose Canyon	SWSE Sec. 29 T28N, R112W	X	
<b>East Chimney Pasture</b>			
Flat Top	SWNE Sec. 4 T28N, R112W	X	
<b>West Chimney Pasture</b>			
Chimney Butte	SWNE Sec. 1 T28N, R113W	X	
<b>Cretaceous Pasture</b>			
Dry Basin	NWNE Sec. 1 T28N, R114W	X <sup>2</sup>	X <sup>3</sup>
Mountain Home	SWNE Sec. 30 T29N, R113W	X	

<sup>1</sup> Trend study areas where "Permanent Plot Transects" may be necessary.

<sup>2</sup> Utilization studies in riparian areas which involve the "Paired Plot" (utilization cage) method.

<sup>3</sup> Trend study areas where the "Green Line Riparian Monitoring Method" may be incorporated.

off allotment, etc.). These data are extremely important in evaluating the AMP. When used in conjunction with other data, such as forage utilization and climate, it can be useful in adjusting allotment grazing capacities.

It is also important to record other use made in the pasture or allotment. This type of use could include trespass livestock, or wildlife. It is very difficult to obtain accurate data for wildlife, but every effort must be made to record this information as it is observed, particularly if an unusually heavy concentration of animals remains in a pasture or allotment.

All deviations from licensed use must be noted. Water hauling, water problems, death and losses, management problems, etc., should be noted on the actual use form.

### Utilization

Utilization is defined as the percent of the current year's growth consumed by animals during a given grazing period. These data can be used in conjunction with actual use and climate data to make stocking adjustments. This will be done by comparing measured utilization rates with proper or allowable rates for a particular key species. The following methods will be used to collect forage utilization data:

1. Key Forage Plant Method for use pattern mapping.
2. Ocular Estimate by Plot and/or Height-Weight Curves for key areas.
3. Paired Plot Method for riparian areas.



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Data will be gathered when livestock are moved from a pasture or allotment. Measurements may be necessary before the scheduled move date if appearances indicate that 50 percent utilization is being approached. Key species will be selected for the purpose of measuring utilization. Key species will vary substantially between key areas due to large differences in topography and elevation. Key species will be identified during the 1990 and 1991 grazing seasons. To insure consistency in measuring utilization from year to year, a permanent transect will be established in selected key areas. This transect will consist of a marker post and compass direction in which the transect will be walked from the post. This will insure that the utilization will be measured in the same area year after year.

Utilization cages will be set up in some key areas, particularly in riparian areas, to aid in determining the appearance of ungrazed plants so that a more accurate estimate of utilization can be made. Utilization data may also be collected in other areas of the allotment so that an accurate estimate of utilization allotment wide may be made.

Livestock utilization will be measured on the current standing vegetation at the end of the grazing period designated for a particular pasture. Treatments other than "Early Fall" and "Late Fall" will allow for forage regrowth prior to the end of the growing season. Spring grazing treatments will be limited to 26 days or less and substantial regrowth will occur. On most years, grasses that were grazed during the spring grazing treatments will regrow to full maturity and produce seeds. If livestock utilization is 50 percent of the current crop at the time livestock are removed it will be substantially less than 50 percent of the current years growth after regrowth occurs.

Although range management literature may contain a wide range of recommendations on proper degrees of grazing use, those listed in this plan are based on research and experience which indicates that most native forage plants can remain vigorous and productive if at least 50 percent of the annual production, by weight, remains at the end of the growing season (SCS National Range Handbook). Forty percent livestock utilization is being recommended in Dry Basin Draw and near Dry Piney Creek due to past utilization problems noted in these specific riparian areas. Utilization targets may be changed from percentages to stubble heights when data on these relationships become available for these allotments.

### Climate

Precipitation data will be collected from rain gauges in or near the allotments. This is currently being collected from three locations:

Calpet gauge

- SESE Sec. 26 T27N, R113W

Graphite Hollow gauge

- SWSW Sec.23 T27N, R114W

Deer Hills gauge

- NWSW Sec. 24 T30N, R113W

Temperature and precipitation data will also be obtained from the National Climatic Data Center site at Big Piney.

### Trend

Trend data will indicate the direction of change in the general health of the range resource. These data can be used in conjunction with other monitoring data to assist in making adjustments in grazing use.

Photo points will be the primary tool for evaluating trend on this allotment. They shall be marked with a post and identified by legal description and compass bearing such that the photo can be repeatable. The purpose is to establish a photographic record that will show changes as a result of management. Closeup photographs of an established plot show the soil surface characteristics and the amount of ground surface (at a given time) covered by vegetation and litter. General view photographs present a broad view of the area. These photographs, compared with other photographs of the same site taken in later years, furnish visual evidence of vegetation and soil changes.

If high intensity trend monitoring becomes necessary, "Permanent Plot Transects" will be established in critical key areas. These transects will be established and data will be collected according to Wyoming Rangeland Monitoring Handbook (H-4423-1). Under the "Permanent Plot Transect" method, ten 9.6-square-foot plots will be systematically spaced along a permanently located transect. The following indicators of trend can be monitored under this method: cover, composition (by weight and cover), density, frequency, production, age class, and utilization. This method of tracking trend is very time consuming and is usually only done for monitoring a specific problem. A minimum record of change can be maintained through photographs taken of each plot at specified time intervals.

Trend monitoring in riparian areas is more time consuming than upland trend monitoring. "Permanent Plot Transects" or any of the other fixed plot methods require substantially more time for establishment and data collection in riparian communities than in upland communities. Fixed plot methods are designed to quantify small changes in plant community composition over long periods of time. Plant succession in riparian areas moves rapidly. By using a line intercept method, change can be



## APPENDIX F

tracked by observing changes in plant community types rather than changes to composition within a plant community.

The "Green Line Riparian Monitoring Method" is an adaptation to a technique originated for the Forest Service Intermountain Region 4, by Alma H. Winward. This method relies on identification of riparian plant community types on a pace (step) transect. It is based on the premise that, given site specific objectives, some plant communities are more desirable than others. By observing these communities over time, trend toward or away from objectives may be tracked. Riparian objectives may be defined by specifying short-term improvements utilizing a desired plant community approach.

### Observation

Written records of what happens on an allotment are extremely important. This includes things such as droughts, trespass livestock, problems with range improvements, etc. Any item that may be important in evaluating the allotment must be documented.

In this category are also livestock operator contacts. The livestock operator is in much closer contact with the allotment than most BLM employees. BLM will work closely with the operator and record his observations to achieve an accurate evaluation of the range and management systems. Livestock operator contact will receive high priority.

### Schedule for Collecting Monitoring Data

#### Actual Use

Actual use data for livestock will be obtained from permittees by Actual Grazing Use Reports 15 days after the close of the grazing period for the allotment. Actual use may also be requested after pasture moves in the spring and summer.

#### Utilization

Forage utilization will be measured on an annual basis. Every attempt will be made to measure utilization within two weeks of the time that livestock have been removed from the pasture. Utilization measurements may be necessary before the scheduled move date if excessive use is becoming apparent.

### Climate

The rain gauge will be read four times each year as near as possible to April 15, July 1, September 1, and October 15. National Climatic Data Center reports are published monthly and include daily temperature and precipitation data.

### Trend

Initially, trend photos will be read at yearly intervals. After full implementation of the AMP, trend photos will be taken at the completion of each grazing cycle. If "Permanent Plot Transects" are established, they will be read at the completion of each grazing cycle initially and extended to five year cycles, if no specific problem is identified.

### Observation

This will be an ongoing process.

### Evaluation

At the end of each grazing cycle, after implementation of this plan, an evaluation report will be made in accordance with BLM Manual 4413. The purpose of the evaluation will be to determine the effectiveness of the plan in meeting the objectives and also to insure that the forage allocations are appropriate. If the objectives are not being accomplished, or the forage allocations are not appropriate, a change to the plan or forage allocations may be necessary.

### Key Areas

Within the Calpet Common and North LaBarge Common allotments, potential key areas (Table F-1) and associated monitoring studies were identified during the 1989 grazing season. Alterations to the key area selection and monitoring studies will be carried out during the 1990 grazing season. Most monitoring studies will be established during the 1990 and 1991 grazing seasons (key species will be identified at this time). Additional monitoring studies may be incorporated as needed.



## GROUNDWATER

### General

Plans for groundwater monitoring in this area were initiated by the Riley Ridge EIS prepared for the Exxon CO<sub>2</sub> project. The Record of Decision (1984) for that EIS called for groundwater monitoring, the exact nature of which was to be determined. Exxon agreed to monitoring but suggested that it not be exclusive to their project and include other operators in the area. The BLM agreed with Exxon's suggestion and focused on the entire area.

Because little was known about the area's groundwater system, BLM entered into an interagency agreement with USGS Water Resources Division in Cheyenne. Under this agreement, a base level study defining the aquifer system in the Big Piney/LaBarge area was completed in 1988 at a cost to the BLM of approximately \$50,000. The study, "Hydrogeology of the Riley Ridge-LaBarge Area, Southwestern Wyoming," included water quality data available at the time. This report, coupled with water quality data collected during permitting of Exxon's Riley Ridge project (Water Resources Technical Memorandum B710, prepared by Environmental Research and Technology, Inc.), provides background groundwater quality data and for the area.

Hydrocarbon seepage suspected of being associated with oil and gas production has been discovered in several isolated locations within the Big Piney/LaBarge producing area.

Several specific areas of contamination are at or near The Hogsback, in the Hogsback Unit. This contamination was/is in the form of condensate and oil flowing with water from existing springs. Two of the seeps appear to have stopped, while one continues. Mobil, as operator, continues to monitor these seeps and contain the hydrocarbons at the surface. Mobil Oil's typing of condensate from one of the seeps tied the hydrocarbons to production at two specific wells. Typing of seep oil at another location by Exxon failed to tie seepage to any nearby production. Reports by both operators conclude that the seepage is natural. The BLM is unsure of these conclusions based on historical and geological data.

Historical data indicates one natural seep location in the Big Piney/LaBarge producing area. This seep was first documented in 1907 and was responsible for much of the initial interest in the area as an oil field. Located in the SE¼ of Section 34, T27N-R113W, the seep lies at the center of LaBarge Field where oil production is from shallow wells drilled into the Almy/Ft. Union section. No other reports of naturally occurring surface seepage have been found. To date, no production from either the

Wasatch or the Darby plate Paleozoic section has been established. These sections appear to be water bearing only. Production from shallow formations in the CAP area is restricted to the Almy/Ft. Union Formation(s), which are the only near surface water bearing zones that are naturally hydrocarbon bearing.

Oil was also found floating on groundwater during excavation for Northwest Pipeline Company's facilities. The Wyoming DEQ is currently working with Northwest to determine the source of this contamination.

It is because of these oil seeps and contamination problems, and the fact that over 1,860 wells have been drilled here since the 1920s, that concerns have been raised. Many older wells, both producers and plugged and abandoned wells, may have deteriorating cement or casing which could result in the mixing of lower quality, high salinity waters and hydrocarbons with useable waters. Increased salinity is of particular concern in the Colorado/Green River system of which this groundwater/surface water system is a part.

### Groundwater Monitoring

As outlined in Appendix C, the BLM currently is requiring surface casing and cement through the Wasatch Formation, or isolation of other zones from the Wasatch, in an effort to protect the water bearing zones in that formation. The Wasatch is the chief source for groundwater in the area.

A groundwater monitoring program is proposed which would include the entire Big Piney/LaBarge producing area. As stated above, groundwater monitoring was called for in the Riley Ridge EIS/ROD.

All operations under this program, information collected, and any contamination problems or cleanup would be coordinated with the Water Quality Division of the Wyoming Department of Environmental Quality (DEQ).

Implementation of the program would be through a Cooperative Agreement (CA) between BLM and the oil and gas operators, which is included as Appendix H. This CA, coupled with the details presented here and the monitoring locations shown on Map 12, would guide the monitoring study.

Sampling would begin in the Spring of 1991 and continue for 3 years. At the end of 3 years, the program would be reviewed and modified as necessary. A report would be prepared by BLM at the end of this 3-year period to summarize the findings, discuss problems, and present recommendations for future actions.



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Existing water wells (Map 12) used by the oil and gas industry, and town water supplies in LaBarge, Big Piney, and Marbleton would be the main sampling sources. Based on operator-supplied information, a number of water wells which are now on pump have been selected for sampling. Spacing is such that they should provide for representative sampling of the aquifers. Sampling would concentrate on the upper aquifers of the Wasatch Formation and aquifers within the Paleozoic carbonate section of the Darby thrust plate.

Sample collection would be the responsibility of the BLM. Samples would be collected twice yearly (May and September) and submitted for analysis. BLM would distribute the data to the operators and to the Wyoming DEQ. The data would also be made available to the public.

Under the program as proposed, the operators would pay the cost of the sample analysis. Thirty sample sites would be included in the program. At an estimated cost of \$75.00 per sample, the yearly total analysis cost would be \$4,500. Costs would be shared by the seven operators involved, based on the number of well completions per operator. Total number of completions for each operator was derived from the BLM Automated Inspection Record System (AIRS), and includes producing wells, injection wells, shut-in wells, and temporarily abandoned wells. The proposed cost breakdown is shown in Table F-2.

**TABLE F-2**  
**PROPOSED COST BREAKDOWN OF**  
**WATER SAMPLE ANALYSIS**

Operator	Wells	Percentage	Cost Share (\$)
Enron	635	52.3	2,353.50
Texaco	236	19.4	873.00
Mobil	164	13.5	607.50
Chevron	80	6.6	297.00
Western	37	3.1	139.50
Exxon	33	2.7	121.50
Wexpro	29	2.4	108.00
<b>Total</b>	<b>1,214</b>	<b>100.0</b>	<b>4,500.00</b>

Sample analysis would include the following parameters, which were chosen as the minimum necessary for adequate sampling while still being representative of the known composition of area groundwater:

- Cations (sodium, potassium, magnesium, calcium)
- Anions (chloride, sulfate, carbonate, bicarbonate)
- Trace elements (iron)
- Other constituents (pH, conductivity, total alkalinity, total dissolved solids, chemical oxygen demand).

These parameters are basic to most water quality sampling, with the exception of chemical oxygen demand (COD). COD evaluates both the organic and inorganic content of water. When used in conjunction with all sample parameters, it can give a good assessment of the presence of organic compounds (including hydrocarbons). COD would be

used in place of an oil and grease measurement. It should provide a more accurate assessment of hydrocarbon contamination, and is cheaper than the oil and grease measurement.

Sampling would be in accordance with the techniques outlined in Chapter 2 of Handbook on Recommended Methods for Water Data Acquisition (USGS 1980b). The contractor will provide sample collection bottles, shipping containers and appropriate preservatives to carry out sampling. Data would be transmitted in a data base format which would tie in with the well data base to be included with the project map.

If significant contamination is found, more extensive analysis would be required, but only in the area where it is located. The operator from whose facilities contamination is determined to originate (if this can be determined) would be responsible for source detection and cleanup in a manner determined and agreed upon by the operator(s), the DEQ, and the BLM.



Significance criteria would be based on water quality data documented in the two previously referenced documents; the USGS Water Resources Investigations Report, "Hydrogeology of the Riley Ridge-LaBarge Area, Southwestern Wyoming," and Environmental Research and Technology, Inc.'s "Water Resources Technical Memorandum B710". Map 6 from the USGS paper, entitled Surface and ground- water quality, presents Stiff diagrams and contouring of area water quality.

This information, in conjunction with specific water quality data from Memorandum B710, would be the base from which water samples will be compared. For example, if monitoring indicates total dissolved solids (TDS) levels are well above (i.e. 500-1000 mg/l TDS) what is expected in a certain location based on the background information, significant degradation **may** be occurring and further analysis of that area would be considered.

Criteria for other sample parameters would also be based on the previously collected background data, which, again, is presented on Map 6 of the USGS paper and in Memorandum B710. A major departure from the expected constituent values (i.e. the major anions and cations tested for) may also be an indication that further testing is necessary. Also, if the COD exceeds 50 mg/l, significant contamination may be present. This measurement is evaluated in conjunction with other measurements to ensure that it is indicating the presence of organic contamination.

The monitoring program hopefully would add to our understanding of the area's aquifer systems. The Wasatch aquifer system includes many discrete water-bearing sand lenses separated by relatively impermeable beds. It is unknown if, or to what extent, the permeable beds are interconnected. Less is known about interconnections between porous water-bearing zones in the Paleozoic carbonates. Because the available wells are developed in various sands and carbonate sections in different formations, water quality data may indicate whether mixing of aquifers is occurring.

Mixing of aquifers is of concern due to the large number of wells which penetrate rocks bearing waters of varying quality as well as hydrocarbons. Several fields in the area produce from strata in close stratigraphic proximity to good quality aquifers (Fort Union "Almy" and Mesaverde near the Wasatch). Artificial pressure variations (e.g., water flooding), as well as natural pressure variations, can lead to aquifer mixing, especially when aquifers are breached by wellbores.

Information may also be gained about groundwater supplies which could be made available for other resource activities such as wildlife and grazing management.

BLM policy is to comply with State requirements regarding the use and protection of groundwater. Federal laws and regulations (including FLPMA and Executive Orders) define BLM's responsibility relative to groundwater. The BLM has authority and responsibility to monitor activities so as to protect and enhance the quality of the environment. Oil and gas leasing and subsequent permitting of development have the potential to result in environmental quality problems such as groundwater contamination. Because oil and gas activity in the Big Piney/LaBarge area is, and has been fairly intense and some contamination has been found, more must be done to ensure that groundwater quality is protected.

## WATERSHED

### Baseline Monitoring

The USGS water quality gaging station on Dry Piney Creek, Sec. 27, T. 28 N., R. 113 W. was reactivated by the USGS in April, 1990, and will continue to the end of September for the next 5 years to get a temporal representation of water quality. To augment this data, the BLM, concurrent with the USGS, will sample Fogarty Creek and the upper reaches of Dry Piney Creek three times during the field season to get a spacial representation of water quality.

A single stage sediment sampler will be installed in a small undisturbed "Order 2" watershed (a watershed with two drainages), located in T. 28 N., R. 113 W., Sections 23, 24, 25, 26, 35, and 36 (Map 11), to determine the level of sediment load indicative of an undisturbed watershed. If temporal data suggests that the sediment load has exceeded 10 percent and the BMPs are not alleviating this level, then it is possible that activity in the area will have to be reduced until the sediment load is at an acceptable level.

No surface disturbance will be allowed to take place in the control "Order 2" watershed. This watershed is to represent an undisturbed condition, and is needed for future comparisons of BMP effectiveness. Surface disturbance in this watershed would limit the utility of the data collected.



## APPENDIX G

# PROCEDURES FOR PROCESSING REQUESTS FOR EXCEPTIONS FROM SEASONAL STIPULATIONS AND/OR CONDITIONS OF APPROVAL

1. A request for exception (lease stipulation) or relief (permit condition of approval) must be initiated in writing by the operator. This may be done concurrently with submission of an application (typical for situations involving lease stipulations), or subsequent to permit approval (in the case of COAs attached to approved permit).
2. When requested concurrently with an application, the exception from a stipulation or relief from a COA is considered as part of the project proposal in RMP and NEPA compliance review.
3. For separate requests, the request is considered as a unique action and is analyzed and documented individually for RMP and NEPA compliance.
4. In both cases, processing includes coordination with Wyoming Game and Fish Department (WGFD) for seasonal wildlife-based lease stipulations or permit COAs. The general topics that need to be considered when evaluating a request are provided in Table G-1.
5. The unpredictability of weather, animal movement and condition, etc., preclude analysis of requests related to wildlife far in advance of the time periods in question.
6. Analysis of requests include review of potential mitigation measures and alternatives (traffic restrictions, alternative scheduling, staged activity, etc.).

**TABLE G-1**

### **General Topics to be Considered When Evaluating a Request for Exception to Oil and Gas Lease Stipulations or Permit Conditions or Approvals**

(All evaluations must use some form of documented analytical procedure (e.g., Wildlife/Fisheries Productivity Analysis - BLM 6000-INT-14 Training Handbook to support analysis).

#### **I. Abiotic Factors**

##### **A. Climate**

- What are the seasonal weather patterns for the area?
- What are the current snow conditions (depth, crusting, longevity)?
- What are the current and historic precipitation records (amount, periodicity, form)?
- What are the current and historic temperature conditions (norms, lows, recent longevity)?
- What are the current wind chill factors as an indication of animals energy use (daily periodicity and recent longevity)?

##### **B. Water**

- How might the proximity of available water affect animal populations in the area?
- What is the water quality relative to wildlife usability and suitability for fish and aquatic organisms?
- Will the proposed activity create any water hazards (e.g., fish barriers, entrapment, drowning hazards, etc.)?
- Will fish and wildlife habitat be affected by any change in water quality?



## APPENDIX G

### C. Space

- Are there any topographic/geographic habitat limitations present (e.g., escarpments, etc.)?
- What are the current road/access networks and their relationship/proximity to animal use areas and waters supporting fisheries (road density, screening, juxtaposition relative to migration routes)?
- What are the location and density of oil and gas development facilities, as well as other management facilities (e.g., fences), and their impact on wildlife use areas and waters supporting fisheries (facility hazards)?
- Will increased incidence of special competition, both interspecies and intraspecies, result from proposed activities?
- What is the juxtaposition of forage, cover, and water relative to habitat usability?

### D. Soils/Surface Disturbance

- What is the location and condition of roads and drill pads relative to steepness and soil stability?
- What is the location and design of stream crossings relative to stream bank and stream channel stability?

## II. Biotic Factors

### A. Forage

- Will forage competition, both interspecies and intraspecies, result from the proposed activities?
- Are there impacts to forage as a result of oil and gas activities?
- Will proposed activities affect forage quality, quantity, and availability?
- Is there a potential for increased occurrence of gam damage (i.e., damage claims) resulting from oil and gas activities?

### B. Cover

- What is the availability of adequate (quality and quantity) cover, both vegetative and topographic, for both terrestrial and aquatic species?

### C. Mortality/Natality

- What is the current estimate of animal condition in the area?
- What is the likelihood of introduction of disease and increased incidence of epizootics?
- What is the likelihood of increase predation resulting from decreased habitat security and overcrowding as a result of displacement?
- Are there current or potential stress related problems in animal populations resulting from human disturbance and displacement (overcrowding and adverse behavioral modifications resulting from human activities)?
- Is there a likelihood of decrease natality and recruitment resulting from overcrowding?
- What is the likelihood of accidents (e.g., wildlife collisions with vehicles, or poaching) resulting from increased human activity?



## APPENDIX G

### D. Resource Concerns

- Is the original resource concern protected by the stipulation still valid? If not, is there any possibility the original resource concern will return? (Determination must be supported by resource data).
- Do new resource concerns exist? If so, what are they, and how do they relate to this proposal?







# APPENDIX H

## GRAZING ALLOTMENTS AND MANAGEMENT CATEGORIES

### APPENDIX H

#### GRAZING ALLOTMENTS AND MANAGEMENT CATEGORIES<sup>1</sup>

Allotment Number	Allotment Name
<b>High Priority "I" Allotments</b>	
2201	Upper North LaBarge
2077	North LaBarge Common
2035	Deer Hills Individual
2150	Deer Hills Common
<b>"I" Allotments</b>	
2127	McNinch Deer Hills
2129	West of Ranch
2032	Dan Budd Deer Hills
2194	LaBarge Unit Individual
2196	Johnson Ridge
<b>"M" Allotments</b>	
2034	Adjacent To Ranch
2141	Beaver Creek Individual
2142	Beaver Creek Meadows
2100	Dry Piney Individual
2086	Guio Sections
2099	Jory Individual
2091	LaBarge Individual
2161	Norris North Piney
2163	O'Neil Individual
2128	Section 18 Individual
2195	South Piney Individual
2074	South Piney Ranch
2204	Yose Individual
<b>"C" Allotments</b>	
2198	Beaver Tract Individual
2206	Bird Individual
2080	Fox-LaBarge Individual
2079	South Piney Place Meadow
2179	Spence Place Individual

**<sup>1</sup> Management Categories:**

"I" Allotment = Improve Category (e.g., conditions need improvement, conflicts, etc.)

"M" Allotment = Maintenance Category (e.g., conditions satisfactory, no serious conflicts, etc.)

"C" Allotment = Custodial Category (e.g., conditions variable, low production potential, limited conflicts, etc.)







# APPENDIX I

## LANDS SUITABLE FOR CONSIDERATION FOR DISPOSAL, EXCHANGE, AND ACQUISITION

### LANDS DISPOSAL CRITERIA

Lands to be considered for disposal, as a minimum, must meet the following criteria: they are difficult and uneconomical to manage, or their disposal would meet important public objectives such as community expansion or economic development.

In addition, site specific analysis prior to disposal must determine that these lands must have the following characteristics:

They contain no significant wildlife, recreation, or other resource values; have no overriding public values; and represent no substantial public investments;

They are suitable for agricultural, industrial, commercial, or residential development;

Their disposal would best serve the public interest; and

Lands identified for disposal would be considered for exchange with federal, state, or local government or other entities.

Generally, areas within two miles of communities would be considered for community expansion.

### LANDS SUITABLE FOR CONSIDERATION FOR DISPOSAL, EXCHANGE, AND ACQUISITION

Legal Description	Acres
<b>Disposal Parcels (for sale or exchange)</b>	
T. 26 N., R. 112 W. sec. 7, Lot 5	19.57
T. 26 N., R. 113 W. sec. 14, Lot 4, SW $\frac{1}{4}$ SE $\frac{1}{4}$	71.15
T. 29 N., R. 114 W. sec. 25, SE $\frac{1}{4}$ SW $\frac{1}{4}$	40.00
T. 29 N., R. 113 W. sec. 13, SW $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
T. 29 N., R. 112 W. sec. 9, SE $\frac{1}{4}$ SW $\frac{1}{4}$ , N $\frac{1}{2}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$	60.00
T. 30 N., R. 112 W. sec. 7, Lots 2, 3	30.90
T. 31 N., R. 113 W. sec. 19, Lot 3	42.51
T. 26 N., R. 113 W. sec. 7, N $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$	5.00
<b>Total</b>	<b>309.13</b>



# APPENDIX I

## LANDS SUITABLE FOR CONSIDERATION FOR DISPOSAL, EXCHANGE, AND ACQUISITION (Continued)

Legal Description	Acres
<b>Community Expansion Areas</b>	
T. 26 N., R. 112 W. sec. 6, Lots 3, 4, 5, 9, 12-29, SE¼NW¼	
T. 27 N., R. 112 W. sec. 31, Lots 3, 4, 9-11, W½NE¼, E½NW¼, E½SW¼, W½SE¼	
<b>Total</b>	<b>602.02</b>
<b>Exchange Parcels (exchange only)</b>	
T. 30 N., R. 112 W. sec. 7, S½NE¼, N½SE¼	160.00
sec. 8, SW¼NE¼, S½NW¼, N½SW¼, SW¼SE¼	240.00
sec. 17, NW¼NE¼	40.00
<b>Total</b>	<b>440.00</b>



## SOCIOECONOMIC SUMMARY TABLE



**APPENDIX J**  
**SUMMARY OF SOCIOECONOMIC IMPACTS**  
**OIL AND GAS**

Alternatives	Days In Drilling Season	Number Of Wells	Number Of Rig Workers <sup>2</sup>	Percent Of 1989 Rig Force Numbers	Total Rig Worker Income (Millions \$)	Portion Of Total Income Spent Locally (Millions \$)	Other Drilling Expenditures By Oil/Gas Comp.'s By Destination (Millions \$)	4 Co's Local	Nondrilling Local Expend. By Oil/Gas Co's & Their Emps. (Millions \$)	200 Well Sites Reclaimed In 10 Years: <sup>7</sup> Expenditures (Millions \$)	Total: Direct Expenditures To Local Area Over 10 Years <sup>8</sup> (Millions \$)
<b>Alternative A<sup>1</sup></b>											
Scenario 1	107	50	275	138	2.2	1.3	34	17	1.4		
Year 1											
Years 2-10 (Per Year)		28	165	82	1.3	.9	19	9.5	1.4		
<b>10-Year Total</b>		<b>300</b>	<b>N/A</b>	<b>N/A</b>	<b>13.9</b>	<b>9.4</b>	<b>205</b>	<b>102.5</b>	<b>14.0</b>	<b>5.0</b>	<b>130.9</b>
Scenario 2	199	50	140	70	2.0	1.5	34	17	1.4		
Year 1											
Years 2-10 (Per Year)		28	85	43	1.2	1.0	19	9.5	1.4		
<b>10-Year Total</b>		<b>300</b>	<b>N/A</b>	<b>N/A</b>	<b>12.8</b>	<b>10.5</b>	<b>205</b>	<b>102.5</b>	<b>14.0</b>	<b>5.0</b>	<b>132</b>
Scenario 3	305	50	110	55	2.5	1.9	34	17	1.4		
Year 1											
Years 2-10 (Per Year)		28	55	28	1.2	1.0	19	9.5	1.4		
<b>10-Year Total</b>		<b>300</b>	<b>N/A</b>	<b>N/A</b>	<b>13.3</b>	<b>10.9</b>	<b>205</b>	<b>102.5</b>	<b>14.0</b>	<b>5.0</b>	<b>132.4</b>
<b>Alternative B</b>											
Scenario 1	305	100	190	95	4.3	2.8	68	34	1.4		
Year 1											
Years 2-10 (Per Year)		55	110	55	2.5	1.9	37	18.7	1.4		
<b>10-Year Total</b>		<b>600</b>	<b>N/A</b>	<b>N/A</b>	<b>26.8</b>	<b>19.9</b>	<b>401</b>	<b>202.3</b>	<b>14.0</b>	<b>5.0</b>	<b>241.2</b>



**APPENDIX J (Continued)**  
**SUMMARY OF SOCIOECONOMIC IMPACTS**  
**OIL AND GAS**

Alternatives	Days in Drilling Season	Number Of Wells	Number Of Rig Workers <sup>2</sup>	Percent Of 1989 Rig Force Numbers	Total Rig Worker Income (Millions \$)	Portion Of Total Income Spent Locally (Millions \$)	Other Drilling Expenditures By Oil/Gas Comp.'s By Destination (Millions \$)	4 Co's Local	Nondrilling Local Expend. By Oil/Gas Co's & Their Emps. (Millions \$)	200 Well Sites Reclaimed In 10 Years: <sup>7</sup> Expenditures (Millions \$)	Total: Direct Expenditures To Local Area Over 10 Years <sup>8</sup> (Millions \$)
<b>Alternative C<sup>1</sup></b>											
Scenario 1	137	100	380	190	3.8	2.2 <sup>3</sup>	68	4	1.4		
Year 1											
Years 2-10 (Per Year)		55	215	108	2.2	1.4	37	18.7	1.4		
<b>10-Year Total</b>		<b>600</b>	<b>N/A</b>	<b>N/A</b>	<b>23.6</b>	<b>14.8</b>	<b>401</b>	<b>202.3</b>	<b>14.0</b>	<b>5.0</b>	<b>236.1</b>
Scenario 2	244	100	245	123	4.4	2.7 <sup>4</sup>	68	34	1.4		
Year 1											
Years 2-10 (Per Year)		55	135	68	2.4	1.7	37	18.7	1.4		
<b>10-Year Total</b>		<b>600</b>	<b>N/A</b>	<b>N/A</b>	<b>26.0</b>	<b>18.0</b>	<b>401</b>	<b>202.3</b>	<b>14.0</b>	<b>5.0</b>	<b>239.3</b>
Scenario 3	305	100	190	95	4.2	2.8	64	34	1.4		
Year 1											
Years 2-10 (Per Year)		55	110	55	2.4	1.9	37	18.7	1.4		
<b>10-Year Total</b>		<b>600</b>	<b>N/A</b>	<b>N/A</b>	<b>25.8</b>	<b>19.9</b>	<b>401</b>	<b>202.3</b>	<b>14.0</b>	<b>5.0</b>	<b>241.2</b>
<b>Alternatives D &amp; E</b>											
Scenario 1	305	150	275	138	6.1	3.8 <sup>5</sup>	101	51	1.4		
Year 1											
Years 2-10 (Per Year)		83	165	82	3.7	2.5	56	28	1.4		
<b>10-Year Total</b>		<b>900</b>	<b>N/A</b>	<b>N/A</b>	<b>39.4</b>	<b>26.3</b>	<b>605</b>	<b>303</b>	<b>14.0</b>	<b>5.0</b>	<b>348.3</b>



**APPENDIX J (Continued)**  
**SUMMARY OF SOCIOECONOMIC IMPACTS**  
**OIL AND GAS**

Alternatives	Days In Drilling Season	Number Of Wells	Number Of Rig Workers <sup>2</sup>	Percent Of 1989 Rig Force Numbers	Total Rig Worker Income (Millions \$)	Portion Of Total Income Spent Locally (Millions \$)	Other Drilling Expenditures By Oil/Gas Comp.'s By Destination (Millions \$)	4 Co's Local	Nondrilling Local Expend. By Oil/Gas Co's & Their Emps. (Millions \$)	200 Well Sites Reclaimed In 10 Years: <sup>7</sup> Expenditures (Millions \$)	Total: Direct Expenditures To Local Area Over 10 Years <sup>8</sup> (Millions \$)
<b>Alternative F<sup>1</sup></b>											
Scenario 1	107	20	115	58	.9	.7	13.5	6.8	1.4	.5	9.4
Year 1											
<b>10-Year Total</b>		<b>200</b>	<b>N/A</b>	<b>N/A</b>	<b>9.0</b>	<b>6.9</b>	<b>135</b>	<b>68</b>	<b>14.0</b>	<b>5.0</b>	<b>93.9</b>
Scenario 2	199	20	55	28	.8	.6	13.5	6.8	1.4	.5	9.3
Year 1											
<b>10-Year Total</b>		<b>200</b>	<b>N/A</b>	<b>N/A</b>	<b>8.1</b>	<b>6.5</b>	<b>135</b>	<b>68</b>	<b>14.0</b>	<b>5.0</b>	<b>93.5</b>
Scenario 3	305	20	50	25	1.1 <sup>6</sup>	.9 <sup>6</sup>	13.5	6.8	1.4	.5	9.6 <sup>6</sup>
Year 1											
<b>10-Year Total</b>		<b>200</b>	<b>N/A</b>	<b>N/A</b>	<b>11</b>	<b>8.8</b>	<b>135</b>	<b>68</b>	<b>14.0</b>	<b>5.0</b>	<b>95.8</b>

<sup>1</sup> Three scenarios are presented to show impacts under various drilling timeframes. The first depicts a substantially reduced drilling season, hypothesizing severe weather and related restrictions. The second represents a more normal season and is the most likely to occur in the CAP area. The third shows a situation where restrictions on the length of the drilling season would be almost nonexistent. In reality, each season, a small percentage of wells might be drilled in areas where wildlife related restrictions would require a short drilling season while other areas of the CAP might have almost no length-of-season restrictions.

<sup>2</sup> At least 100 rig workers are estimated to be residents of the local area.

<sup>3</sup> If drilling contractors provided housing for their nonresident rig workers, this figure could be closer to \$1.8 million.

<sup>4</sup> This figure could be closer to \$2.1 million if drilling contractors provided housing for nonresident rig workers.

<sup>5</sup> If drilling contractors provided housing for their nonresident rig workers, this figure could be closer to \$3.0 million.

<sup>6</sup> It was assumed for all alternatives and scenarios that workers that workers would work 48 hours/week. However, it is very likely that this could drop to 42 hours/week (or less) in a 305-day season. At 42 hours/week, the total hours worked per season/worker would be 1,830 instead of 2,091 at 48 hours/week. Income/worker/season would be \$19,672, and the total for all 50 would be \$983,593. Expenditures by rig workers in the local area would then be about \$786,874/season. The 10-year total for this scenario would drop to \$90.9 million.

<sup>7</sup> For all but Alternative F, annual numbers of well sites reclaimed is not known. Only the 10-year total is known.

<sup>8</sup> Except for Alternative F, annual totals cannot be computed because the number of well sites reclaimed each year is not known.



# APPENDIX K

## NORTH LABARGE COMMON AND CALPET COMMON ALLOTMENTS

### Grazing System

The grazing system proposal of the CAP applies to the North LaBarge Common and Calpet Common allotments. AMPs for these allotments will not be completed with this CAP because additional considerations are necessary for resources in the western (summer) pastures which are outside the CAP area. These grazing systems and associated grazing treatments are tentative and will be further refined in the forthcoming AMPs.

The present allocated active use and approximate pasture acreage and AUMs for the North LaBarge Common and Calpet Common Allotments is shown in Tables K-1 and K-2 respectively.

North LaBarge Common and Calpet Common allotments are currently used by cattle only. Cow/calf pairs make up a majority of the use with some yearlings being run in conjunction with the cows and calves. Use dates ranging from 5/15 to 10/31 are inconsistent among the eight users. Consistent periods of use will be necessary to achieve workable management systems on these allotments. Coordination between BLM Range Conservationists and LaBarge Roundup Association members will occur during development stages of the AMPs to reach an agreeable period of use. The BLM preferred period of use in areas similar to these allotments is 5/15 to 10/15. These dates need to be flexible, especially the turnout date, during drought conditions and on years of late range readiness.

The emphasis of these grazing systems will be to rotate deferment throughout the entire area so pastures are not being grazed at the same time every year. Additional cattle movement and grazing in common will be necessary to accomplish this goal. Every effort will be made to minimize major cattle drives during pasture changes, some drift movement between pastures will be feasible in years when adjacent pastures are being used consecutively. Livestock grazing deferment will benefit the range and watershed resources.

Four drift fences are proposed to facilitate the deferred grazing system in the Big Mesa pasture. Fences will be 3-wire, designed to accommodate deer movement. Lay down fences may be used where major deer movement areas are identified. Herding livestock with riders will be necessary in those pastures to be used with two treatments (i.e., Calpet, East Chimney, Trail Ridge, and Pine Grove).

Riding to obtain maximum distribution of livestock will be important to the success of this grazing system.

The benefits from grazing deferment include: 1) restoring vigor of livestock and wildlife forage plants, 2) allowing plants to produce seed or rhizomes, 3) reducing fall livestock use on valuable deer winter forage, and 4) leaving available forage for winter wildlife use and spring livestock use.

If grazing can be deferred every 2 or 3 years, forage plants have a better opportunity to reproduce. Grazing after seed maturity affects plants less and allows animals to scatter and trample the seeds into the soil, promoting seedling establishment. By allowing important forage plants to grow unhindered during the period most favorable for their growth, they are able to produce a greater quantity of seed.

Continued fall livestock use on winterfat and Gardner's saltbush appears to be lowering the vigor and reproduction capabilities of these plants. Cattle grazing these ranges in the spring appear to prefer grasses and avoid the shrubs. Periodic fall deferment on these crucial deer winter ranges should restore vigor and reproduction capability of winterfat and Gardner's saltbush.

Crucial to the success of these grazing systems will be: uniform livestock grazing utilization, acceptable utilization levels, and proper design and placement of range improvement projects. The need for coordination between the BLM and the grazing association, as well as coordination within the association, cannot be overemphasized.

The need for flexibility in these grazing systems is recognized due to fluctuations in climate, range readiness, pasture condition, effectiveness of the existing and proposed range improvements projects, future project development, and other unforeseen conditions affecting the management of the range resources.

### Grazing Treatments

Tables K-3 and K-4 list the grazing treatments that are proposed for the Calpet Common and North LaBarge Common allotments. These treatments are dependent on the implementation and success of the proposed range improvements. The proposed grazing treatments for those pastures outside of the



## APPENDIX K

CAP area are included in Table K-4, Proposed Grazing Treatment Formula. The proposed grazing treatments will be given more careful review by the BLM, with the grazing permittee(s), before they become a formal part of an AMP.

In general, treatments are set up on a 154-day use period (May 15 to October 15), each treatment being

25 or 26 days. The length of time for grazing treatments will be adjusted to more accurately reflect the forage available in each pasture. GIS-generated pasture acreages (Table K-2) will help establish a more accurate forage availability in these pastures. The treatment lengths may change before an AMP is completed, but the concept and rotation should remain intact.

**TABLE K-1**  
**ALLOCATED ACTIVE USE**

Name	N. LaBarge Common	Calpet Common
Flying W Land & Livestock	2,316	0
Harrower, Lillian	0	255
JF Ranch, Inc.	4,434	1,467
Sims, Jack C.	449	0
Milleg, Bill	690	0
C & G Enterprises	566	0
Schaffer, Alice M.	2,636	0
Midway Ranches	1,687	0

**TABLE K-2**  
**PASTURE ACRES AND AUMS**  
**CALPET COMMON AND NORTH LABARGE COMMON PASTURES**

Pasture	Acres				AUMs			
	BLM	USFS	State	Deeded	BLM	USFS	State	Deeded
<b>Calpet Common Allotment</b>								
State	586.72	0	1,635.24	7.91	?	0	?	?
Calpet	13,592.77	0	139.17	1,045.35	?	0	?	?
Jory	273.60	0	0	548.77	50	0	?	?
Middle Sawmill	358.99	0	11.07	653.15	?	0	?	?
Black Canyon	5,065.46	0	0	0	?	0	?	?
<b>North LaBarge Common Allotment</b>								
Wildcat Canyon	11,565.32	0	392.21	153.40	?	0	?	?
Yose Canyon	13,371.36	0	977.35	793.90	?	0	?	?
Hogsback	6,033.32	0	653.15	61.68	?	0	?	?
Dry Piney	5,348.55	0	132.84	553.51	?	0	?	?
East Chimney	17,030.89	0	17.40	159.72	1,700*	0	?	?
West Chimney	16,564.35	0	618.36	50.61	1,100*	0	?	?
Cretaceous	12,598.03	0	28.47	31.63	1,200*	0	?	?
Trail Ridge	9,794.07	827.11	12.65	61.68	1,400*	?	?	?
Pinegrove	9,085.57	11,415.08	632.59	457.05	1,600*	?	?	?

? Accurate pasture AUMs will be available after pasture adjustments are made in GIS. Accurate acreages will help to establish a more accurate forage availability in these pastures.

\* These AUM figures were established during the 1967 AMP revision for the North LaBarge Common allotment. These figures include increases given for sagebrush spraying in the mid-1960s and are questionable according to the 1961-62 range survey.



## APPENDIX K

### TABLE K-3

#### GRAZING TREATMENT PROPOSAL DESCRIPTION FOR THE CALPET COMMON AND NORTH LABARGE ALLOTMENTS

Grazing Treatment Abbreviation	Grazing Treatment Description
Esp	Early spring grazing from 5/15 to 6/09. Turn out on range-ready forage. After 6/09, enough regrowth should occur to permit seed development and dissemination at lower elevations. This treatment should minimize livestock utilization on shrubs.
Lsp	Late spring grazing from 6/10 to 7/05. Best period for livestock weight gain. After 7/05, some regrowth should occur but probably not enough for seed development. However, fall rains may result in good regrowth at lower elevations. Minimal livestock utilization on winterfat and Gardner's saltbush may occur.
Esu	Early summer grazing from 7/06 to 7/31. Best period for livestock weight gain. On good growing years some of the grasses (Sandberg's bluegrass, Needle-and-thread, and the rhizomatous wheatgrasses) maybe in the seed ripe stage and ready for seed dissemination. This treatment will provide partial growing season rest for plants to improve their vigor and store reserves for future growth and maintenance.
Lsu	Late summer grazing from 8/01 to 8/25. Most grass plants at higher elevations should be fully mature and ready for seed dissemination. This treatment will provide total growing season rest and good seed scatter. If these seeds are sufficiently scattered and trampled, they should germinate under proper climatic conditions.
Efa	Early fall grazing from 8/26 to 9/19. This treatment would allow for total plant rest from grazing during the growing season. Ample livestock forage should be available after the grasses have been allowed to grow ungrazed throughout the normal growing season. Seed should already be dispersed, and trampling will be important during this period. Fall regrowth may be occurring at lower elevations during this period.
Lfa	Late fall grazing from 9/20 to 10/15. This treatment would allow for total plant rest from grazing during the growing season. Ample livestock forage should be very available after the grasses have been allowed to grow ungrazed throughout the normal growing season. There should be some fall green-up during this time period but not as prevalent as early fall grazing because heavy frosts will be retarding regrowth. Some livestock use will occur on winterfat and Gardner's saltbush. Late fall grazing will be alternated with early spring grazing on the lower pastures (areas that include crucial deer winter range) to help promote vigor and seed production of winterfat and Gardner's saltbush.



# APPENDIX K

**TABLE K-4**  
**GRAZING TREATMENT FORMULA FOR CALPET COMMON**  
**AND NORTH LABARGE COMMON ALLOTMENTS**

Calpet Common Allotment						
Treatment Years	Pastures					
	State <sup>1</sup>	Calpet		Jory <sup>1</sup>	Middle Sawmill <sup>1</sup>	Black Canyon
		South	North			
1 & 2	Esp	Lfa	Efa	Lsp	Esu	Lsu
3 & 4	Lfa	Esp	Lsp	Esu	Lsu	Efa

<sup>1</sup> These pasture treatments are set up for AUMs controlled by the JF Ranch. These pastures are made up primarily of private or State land owned or leased by JF Ranch. The 255 AUMs (50 cattle for 154 days) controlled by Lillian Harrower will be scheduled within the Calpet and Black Canyon pastures.

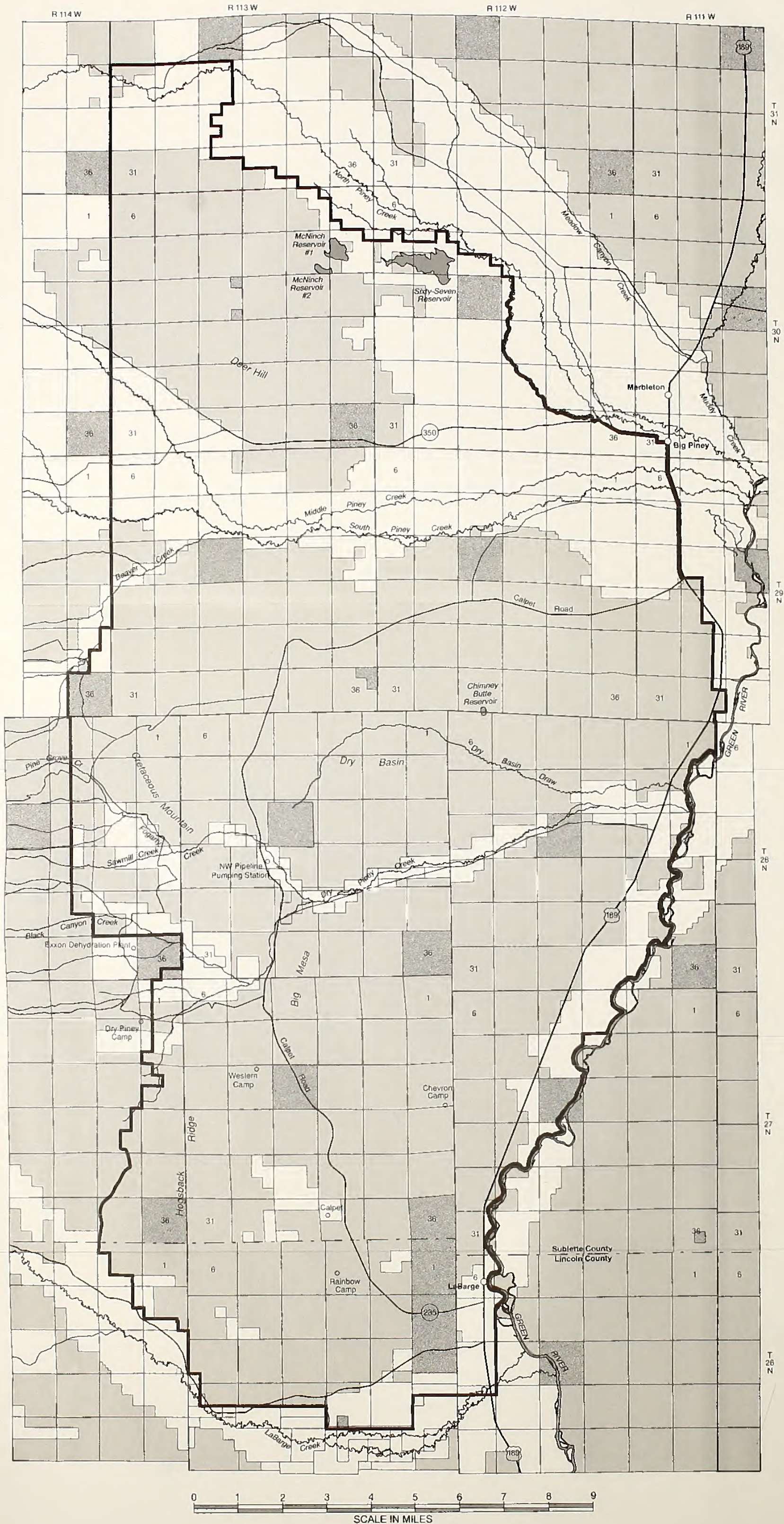
North LaBarge Common Allotment						
Treatment Years	Southern Pastures <sup>1</sup>					
	Blrd Draw	Yose Canyon	Dry Piney	Hogsback	Pine Grove	
					West	East
1	Esp	Lfa	Esu	Lsp	Efa	Lsu
2	Esp	Lfa	Esu	Lsp	Lsu	Efa
3	Lfa	Esp	Lsp	Efa	Lsu	Esu
4	Lfa	Esp	Lsp	Efa	Esu	Lsu

<sup>1</sup> Primary users in southern pastures are Alice Schaffer (2,636 AUMs), Midway Ranches (1,687 AUMs), and Jack Sims (449 AUMs) (a total of 4,772 AUMs).

Northern Pastures <sup>1</sup>						
Treatment Years					Trail Ridge	
	East Chimney		West Chimney	Cretaceous	West	East
	North	South				
1	Esp	Lfa	Lsp	Esu	Efa	Lsu
2	Esp	Lfa	Lsp	Esu	Lsu	Efa
3	Lfa	Esp	Efa	Lsp	Lsu	Esu
4	Lfa	Esp	Efa	Lsp	Esu	Lsu

<sup>1</sup> Primary users in northern pastures are JF Ranch, Inc. (4,434 AUMs), Flying W Land & Livestock (2,316 AUMs), Bill Milleg (690 AUMs), and C&G Enterprises (566 AUMs) (a total of 8,006 AUMs).





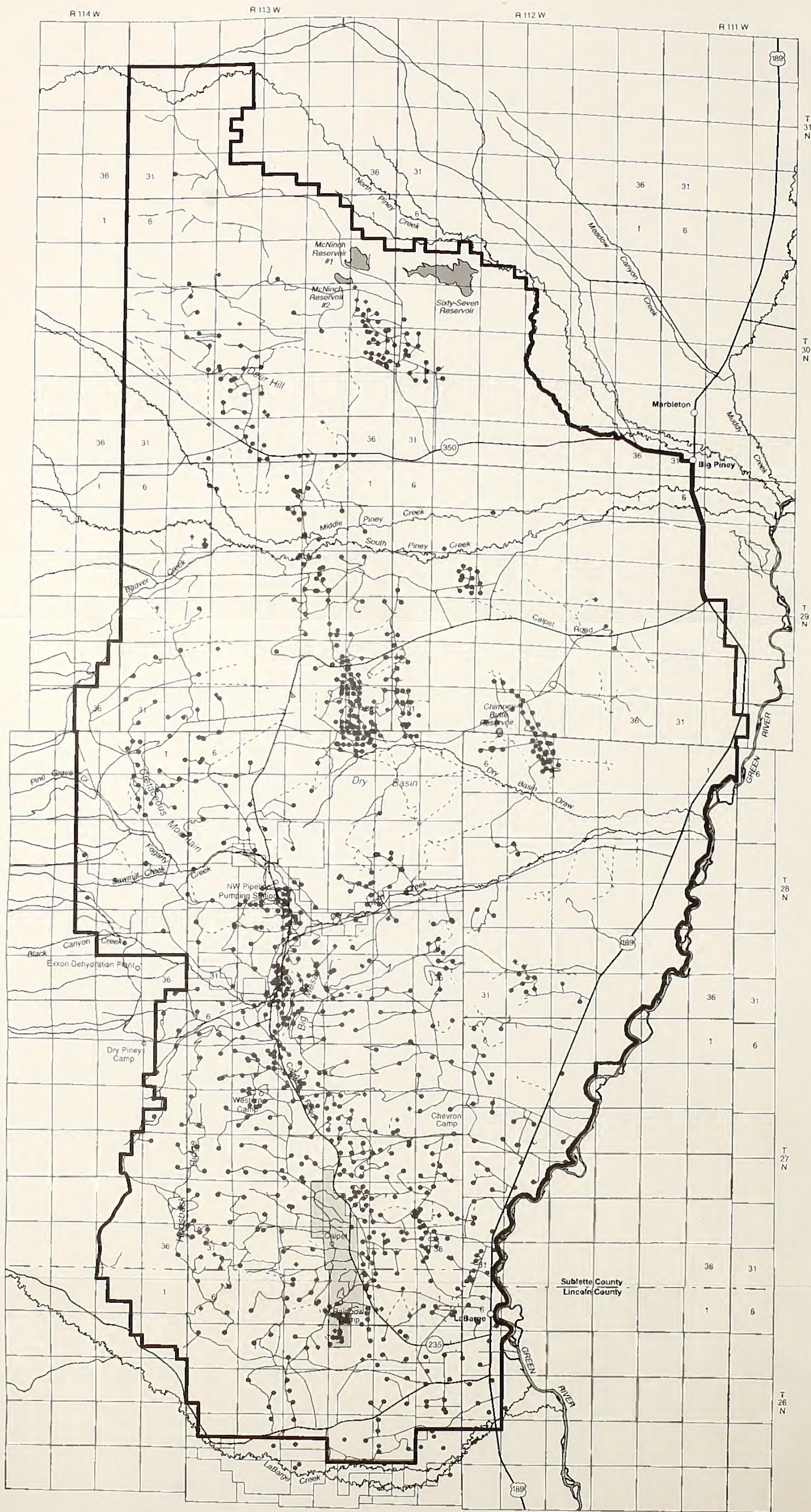
- CAP Boundary
- Federal Lands
- State Lands
- Private Lands









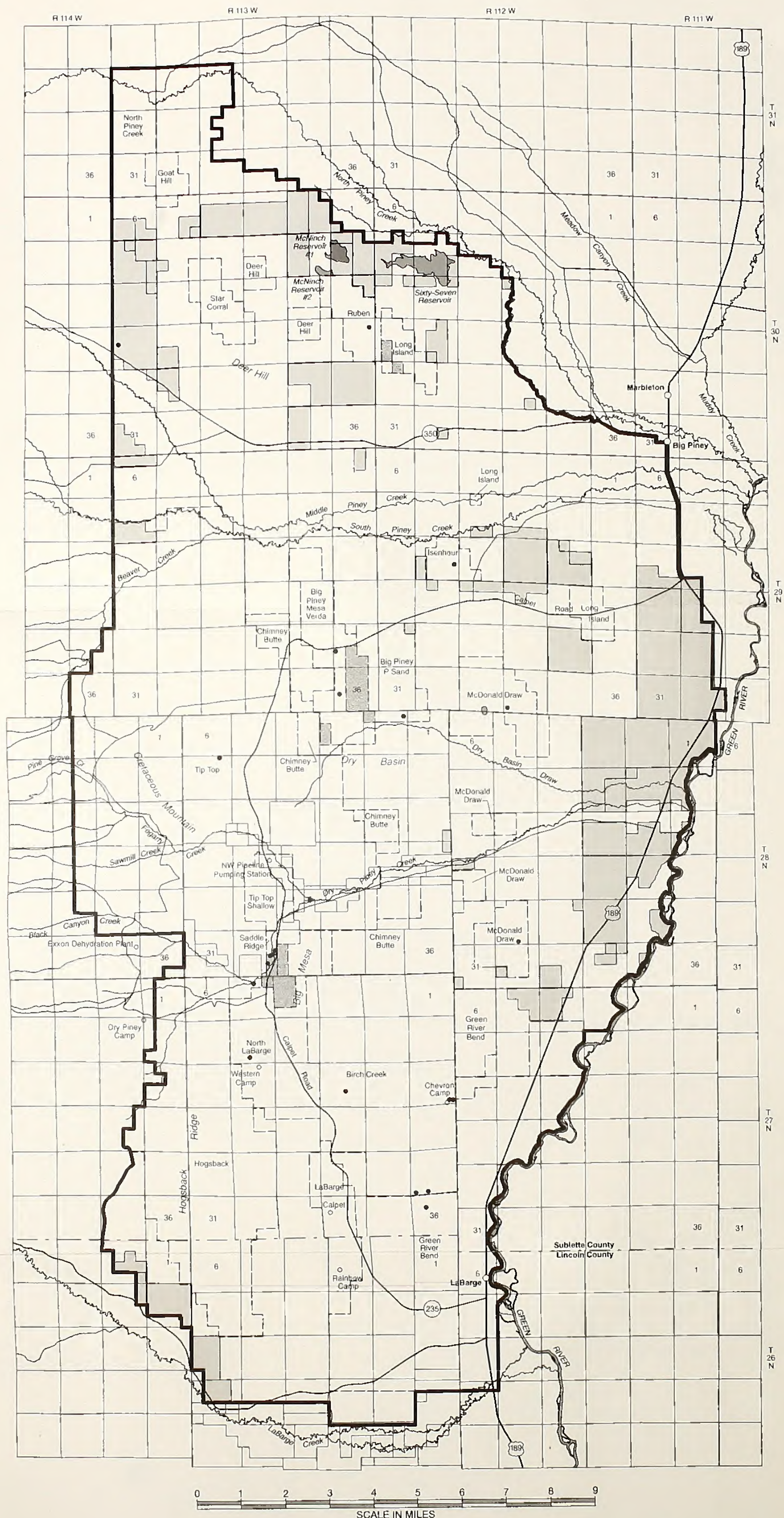


Map 2  
Roads, Oil / Gas Wells, and Reclamation Opportunities  
Big Piney - LaBarge Coordinated Activity Plan







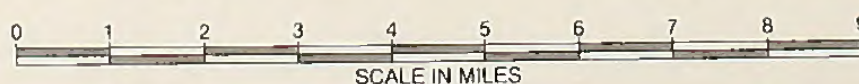
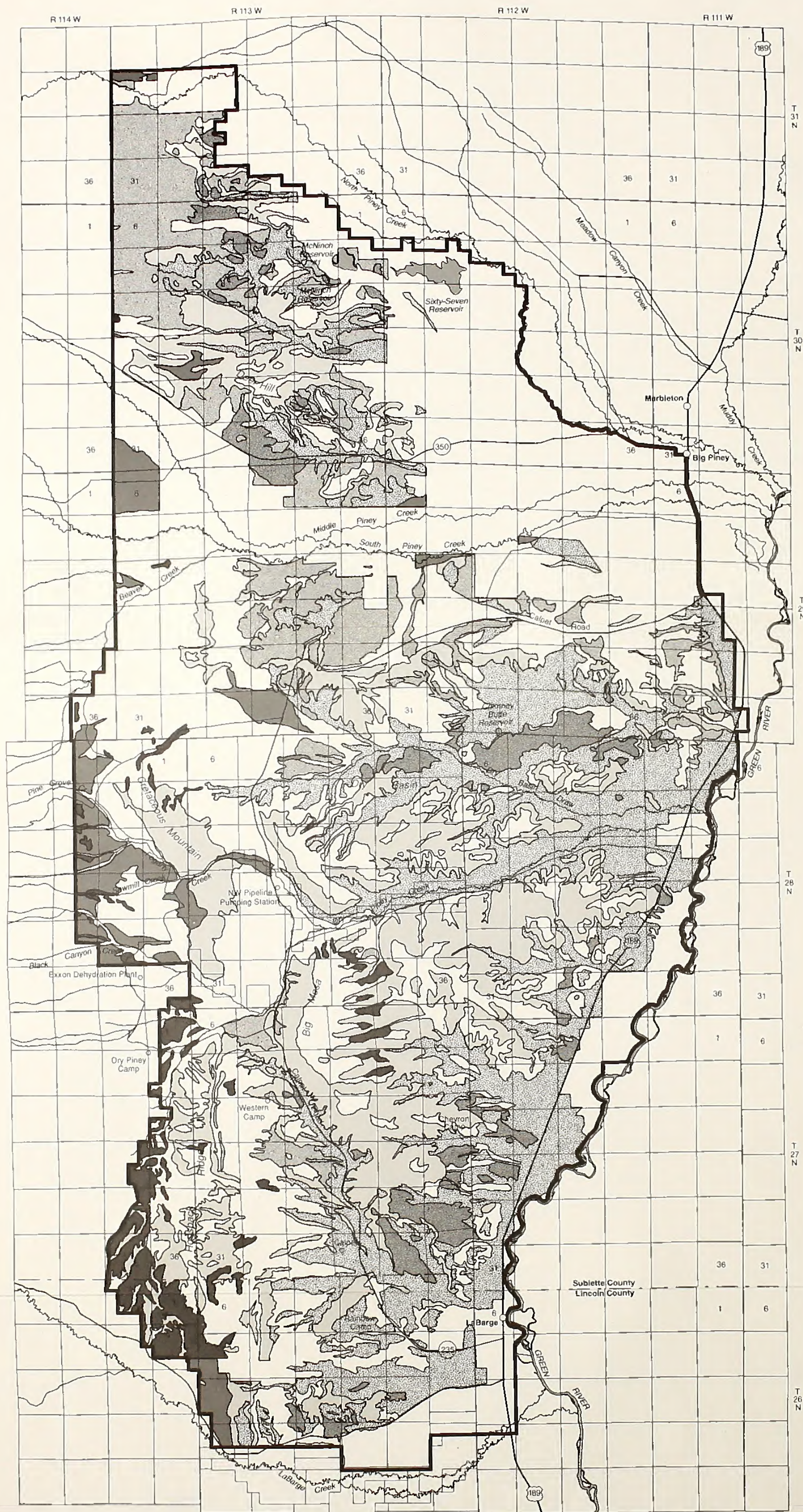


Map 3  
Oil and Gas Units & Water Well Monitoring Locations  
Big Piney - LaBarge Coordinated Activity Plan









- CAP Boundary
- Shallow to Moderately Deep Soils
- Red / Forelle, Highly Erodable Soils
- Saline, Alkaline Soils
- Sandy Soils
- High % Course Fragments
- Slumping, Instable Soils

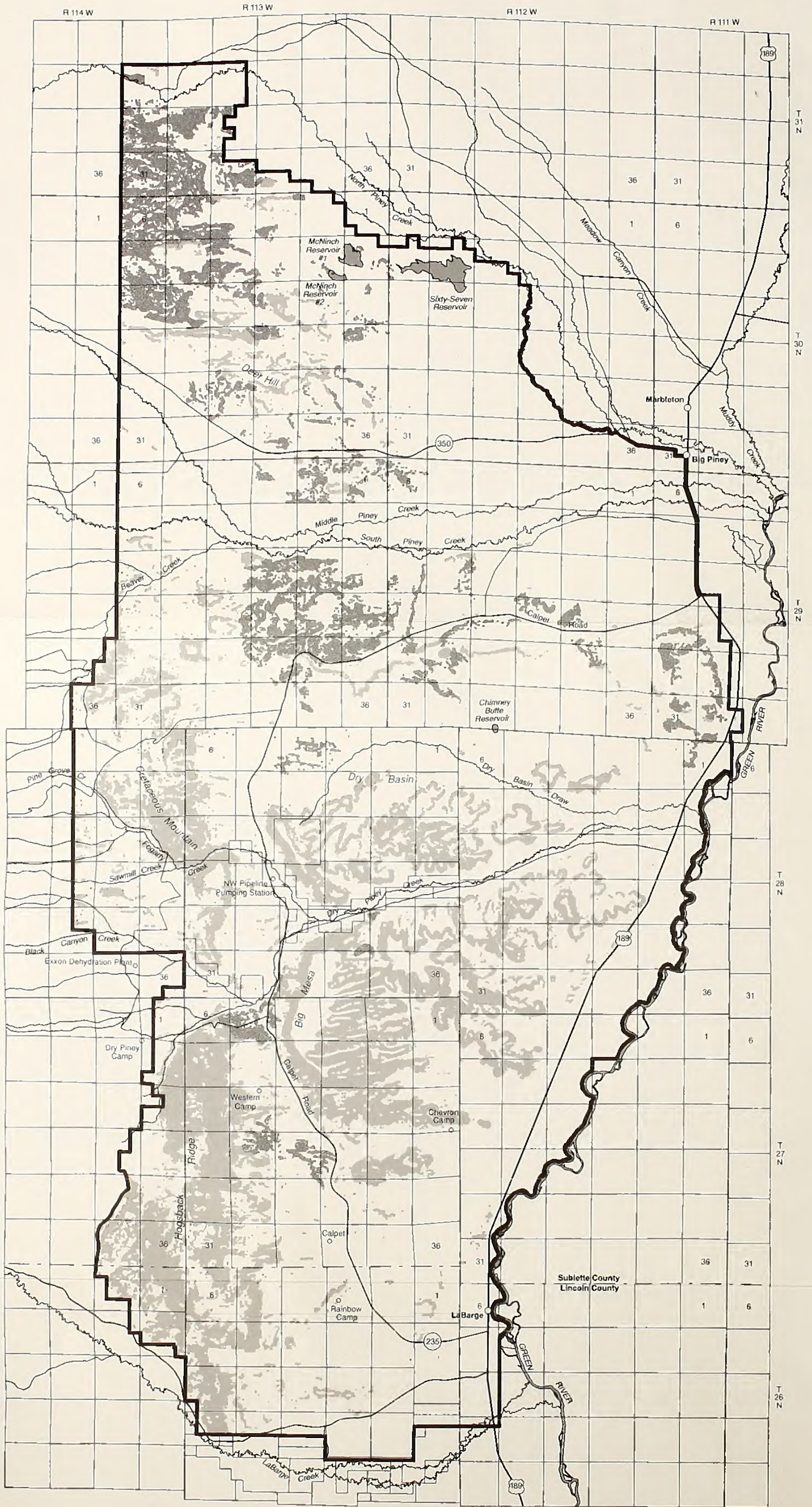


Map 4  
Special Management Soils  
Big Piney - LaBarge Coordinated Activity Plan









- CAP Boundary
- Highly Erodible Soils on Slopes Greater Than 10%
- Slopes Greater Than 25%

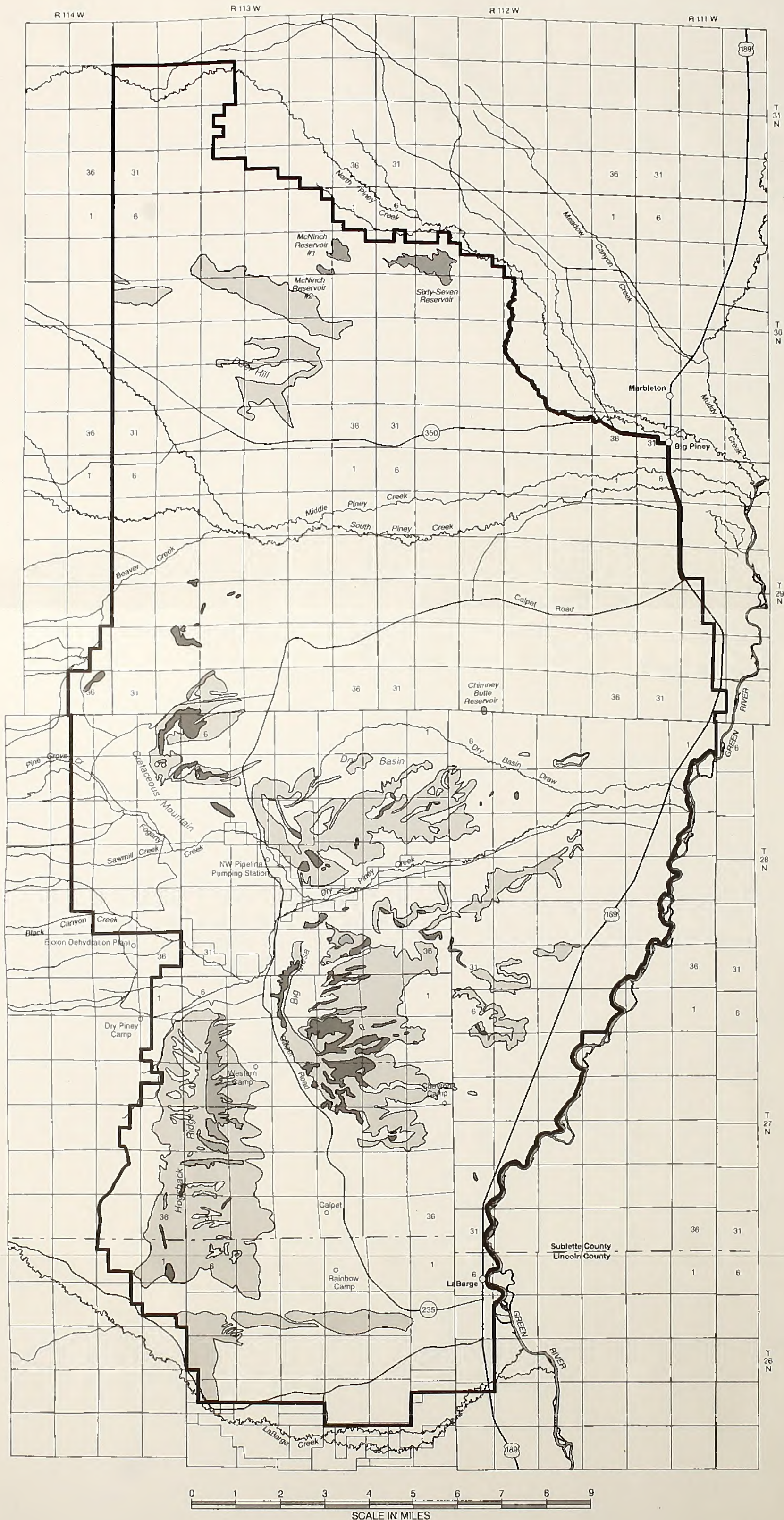


**Map 5**  
**Special Management Areas Due to Slope**  
**Big Piney - Labarge Coordinated Activity Plan**









- CAP Boundary
- Mountain Shrub
- Mountain Shrub Association
- Sagebrush - Mountain Shrub

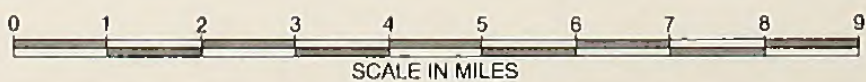
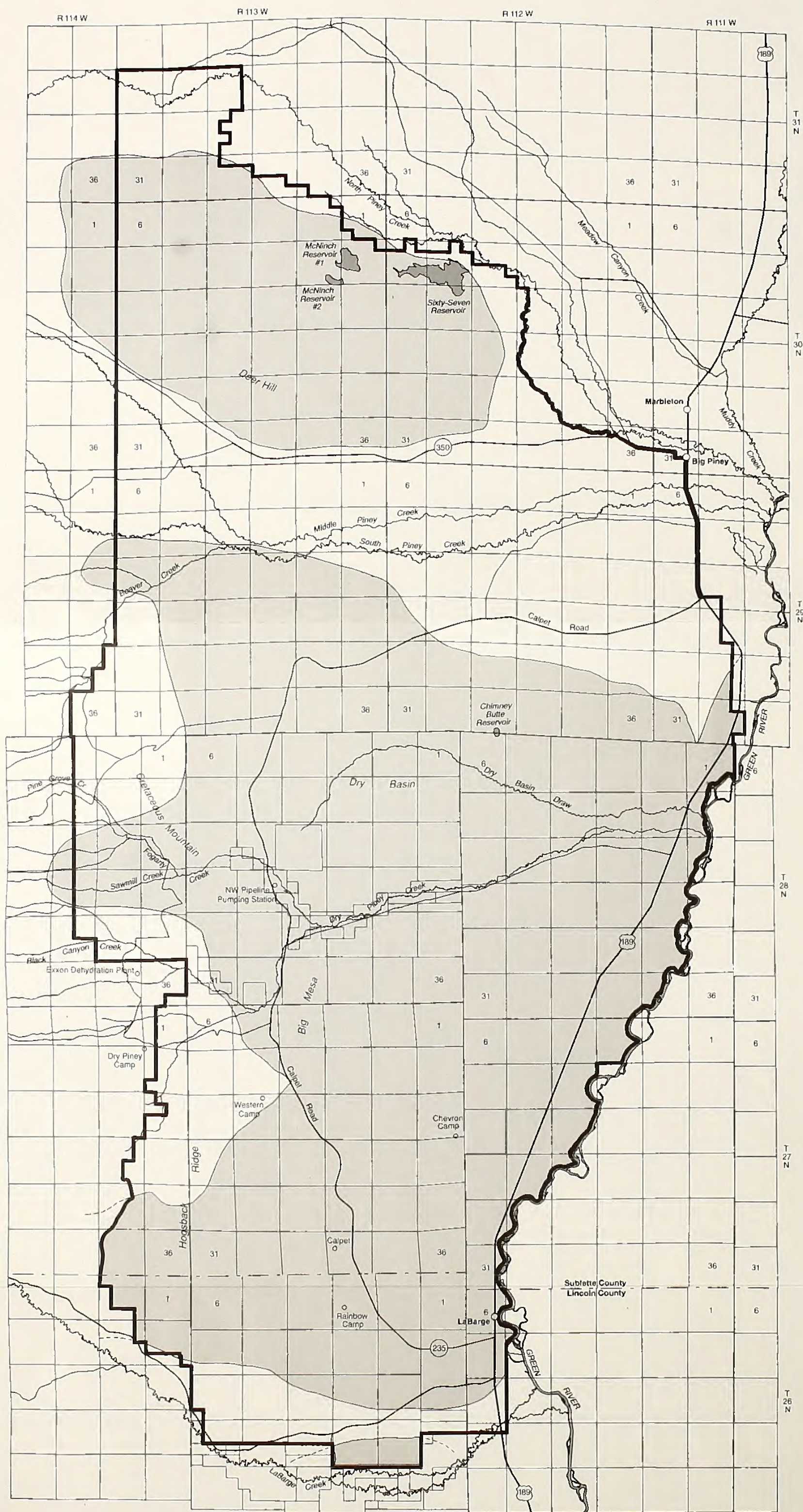


Map 6  
Mountain Shrub Vegetation & Perennial Streams  
Big Piney - LaBarge Coordinated Activity Plan







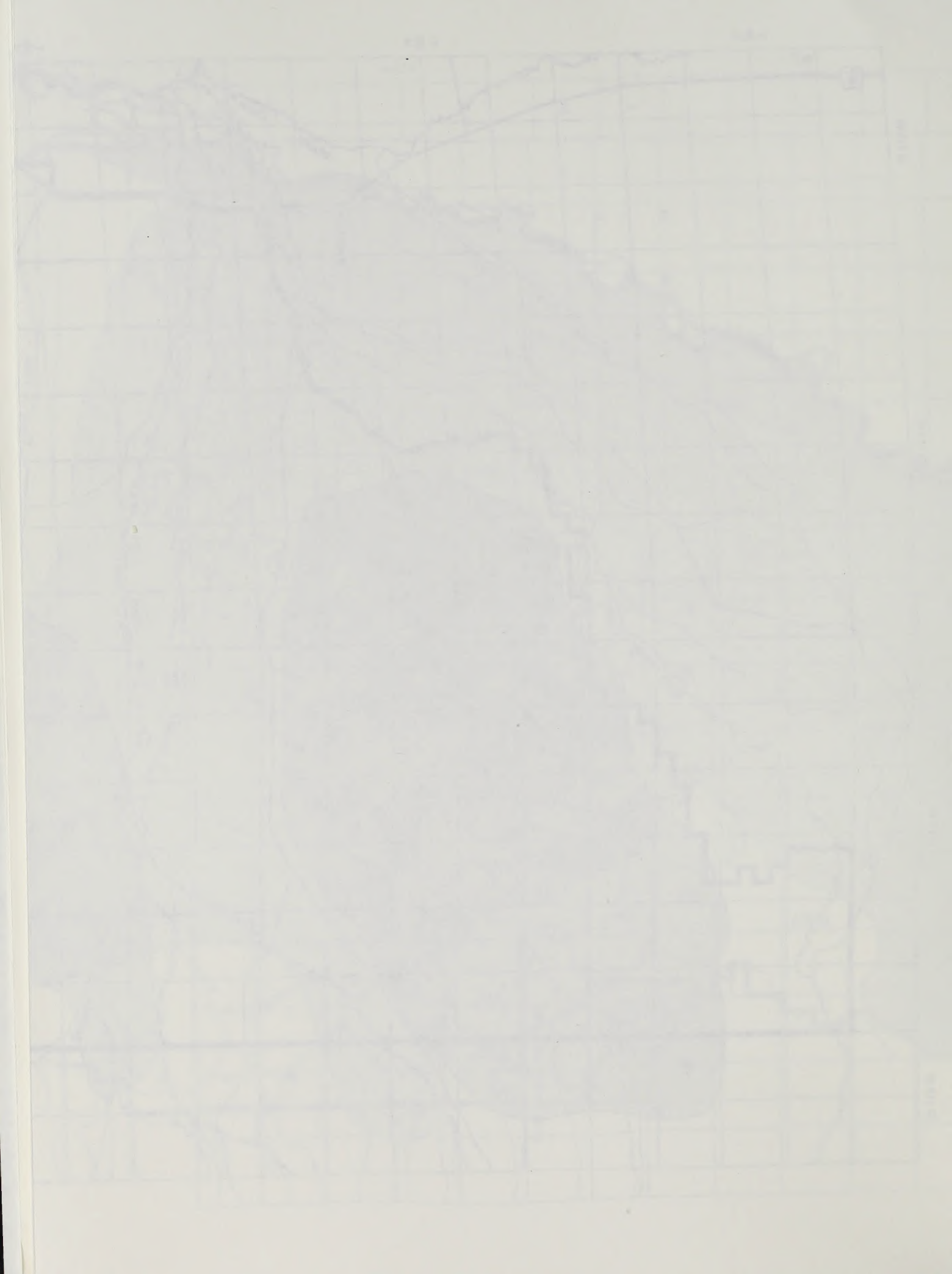


- CAP Boundary
- Crucial Mule Deer Wintering Area

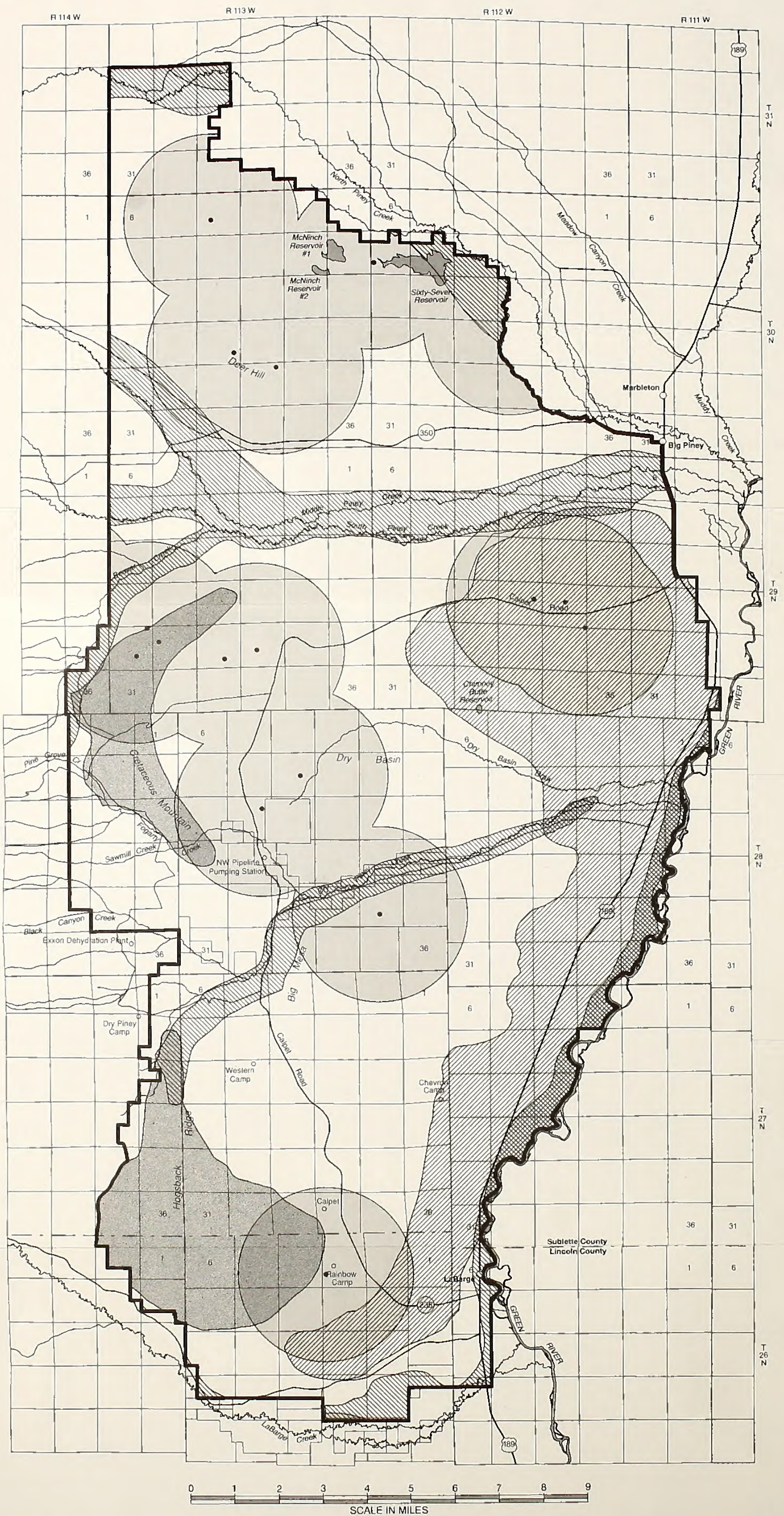


**Map 7**  
**Crucial Mule Deer Winter Habitat**  
**Big Piney - LaBarge Coordinated Activity Plan**









- CAP Boundary
- Crucial Elk Wintering Area
- ▨ Crucial Antelope Wintering Area
- ▩ Crucial Moose Wintering Area
- Sage Grouse Lek Buffer Zone
- Sage Grouse Lek Area



**Map 8**  
**Crucial Elk, Antelope, Moose, and Sage grouse Habitat**  
**Big Piney - LaBarge Coordinated Activity Plan**





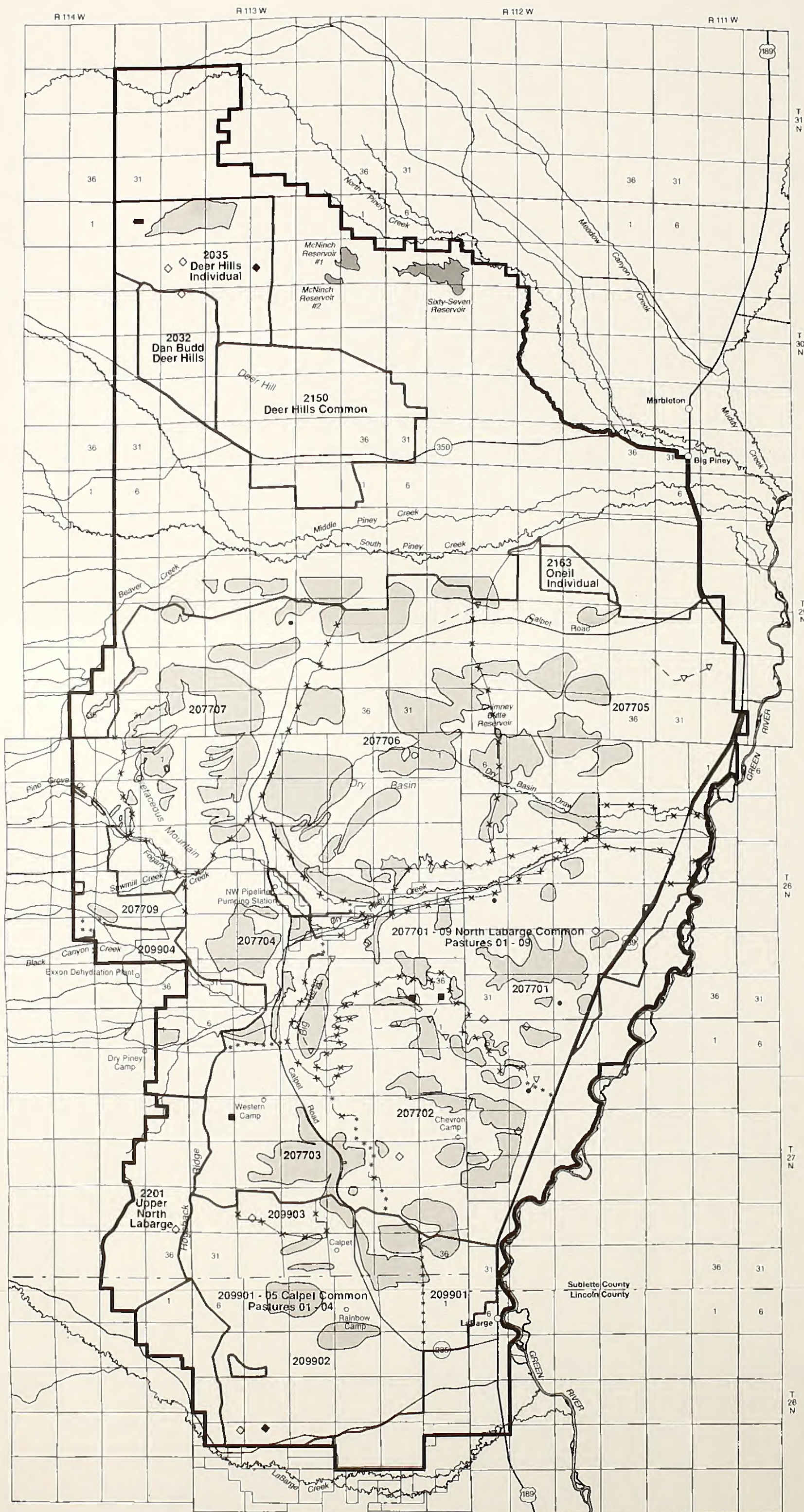












- |                              |                             |
|------------------------------|-----------------------------|
| — CAP Boundary               | ◇ Reservoir                 |
| — Allotment Boundary         | ◆ Reservoir to be Abandoned |
| — Pasture Boundary           | • Water Well                |
| *** Proposed Fence           | ▽ Water Trough              |
| - - - Water Pipeline         | ○ Stock Tank                |
| ■ Vegetative Treatment Area  | ■ Spring                    |
| ■ Private Land or Enclosures |                             |

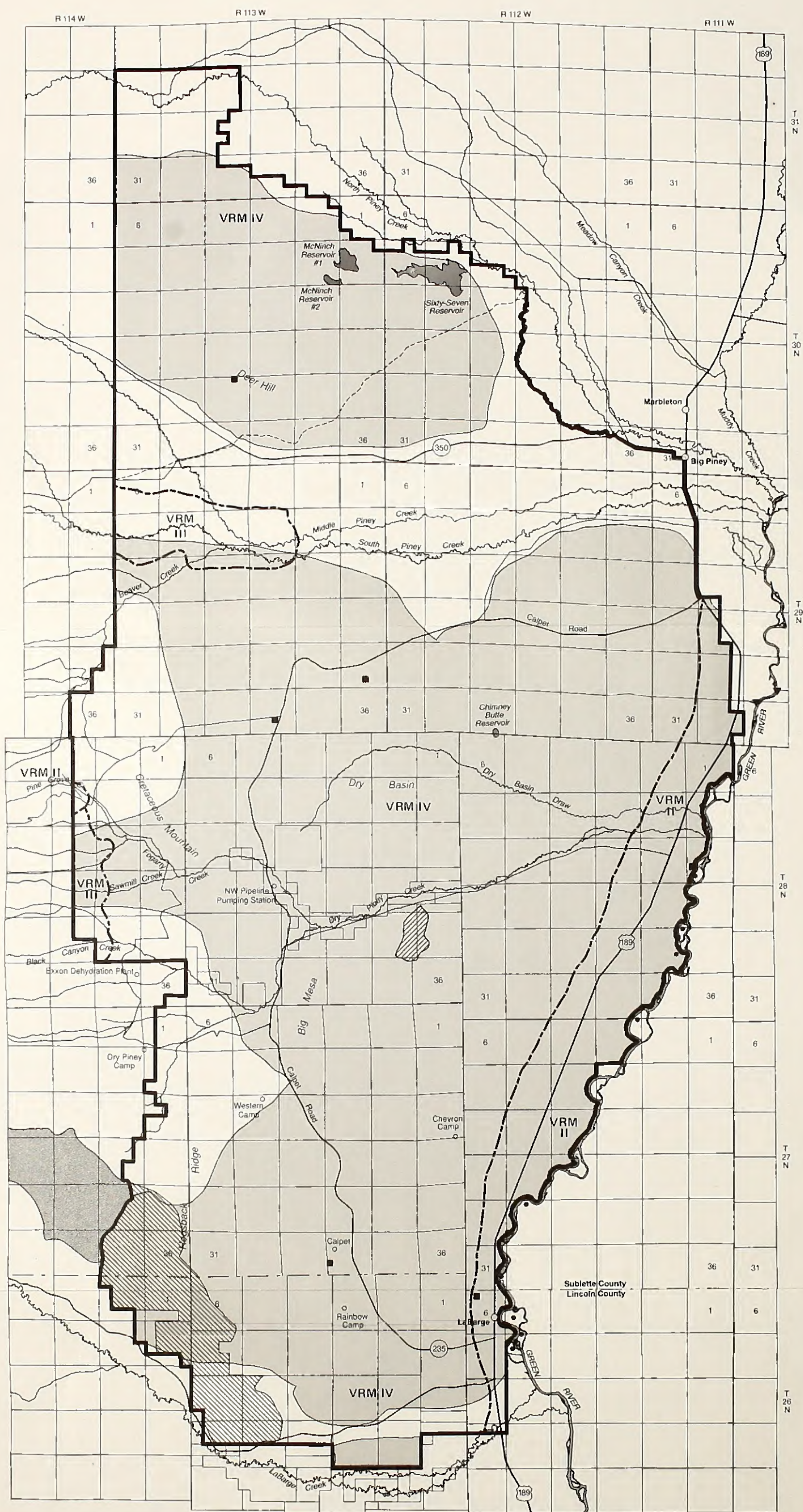
Refer to Appendix L for pasture name

Map 10  
Proposed Resource Improvements  
Big Piney - LaBarge Coordinated Activity Plan









0 1 2 3 4 5 6 7 8 9  
SCALE IN MILES

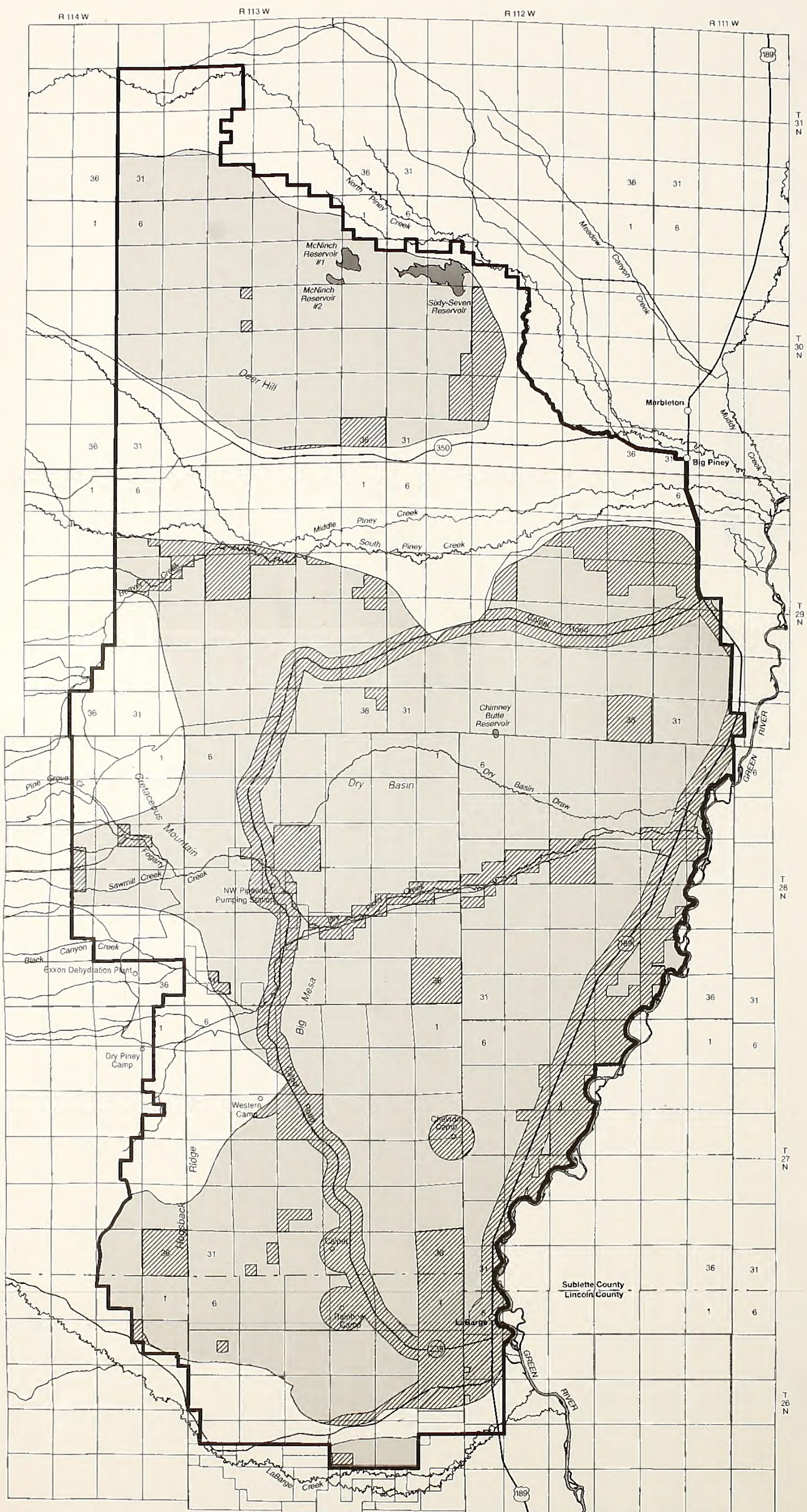
- CAP Boundary
- - - Historic Trail
- · - VRM Class Boundary
- Lake Mountain WSA
- ▨ Control Watershed
- ORV Management Area Deer and Antelope
- ▨ ORV Management Area Elk
- BLM Gravel Pit
- BLM Undeveloped Recreation Sites
- ▼ WGFD Fishing Access Points

Map 11  
Special Management Areas  
Big Piney - LaBarge Coordinated Activity Plan









0 1 2 3 4 5 6 7 8 9  
SCALE IN MILES

- CAP Boundary
- ▨ No Condition of Approval
- ◐ Deer / Antelope Crucial Winter Range



Map 12  
"Alternative C" Crucial Winter Deer and Antelope  
Winter Ranges with Buffer Zones  
Big Piney - LaBarge Coordinated Activity Plan



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